

Ornithological Notes from the Raffles Museum, Nos. 9-14¹

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No. 9, Notes on Abbott's Booby.

Abbott's Booby, *Sula abbotti*, is far the scarcest and least known of the Sulidae. Only two authentic breeding places have been reported,² and it has subsequently been exterminated at the first of these, the type locality. So far as I can ascertain only 15 skins are known, and there is no record of any eggs having been taken, or even measured in the field.

Sula abbotti was described by Ridgway in 1893 (*Proc. U.S. Nat. Mus.*, 16, No. 953, August 1893: 599-600). The description was based on an adult male taken by Dr. W. L. Abbott on Assumption Island in the western Indian Ocean on 18 September, 1892, and now in the U.S. National Museum's collection. No other examples were taken by Abbott and I have been able to trace only two topo-types. These are two unsexed adults collected by J. C. F. (later Sir John) Fryer when he accompanied the 1908-09 Percy Sladen Trust Expedition to the Indian Ocean. Both skins are in the Zoology Museum at the University of Cambridge (*vide infra*). This colony was subsequently much molested by guano-gatherers working on the island, and apparently Abbott's Booby has not been seen there since about 1926 (Vesey-Fitzgerald, 1941: 521) or 1936 (Betts, 1940: 501).

In 1897 Dr. C. W. Andrews found *abbotti* nesting on Christmas Island, at the eastern end of the Indian Ocean, and in October that year shot an adult male on the east side of the island. On a second visit, in 1908, he collected four more specimens (δ 1, η 3). These five skins are now in the British Museum (J. D. Macdonald *in litt.*, 25 February, 1948). A further seven examples (δ 2, η 5) were taken on Christmas Island between 1932 and 1940 for the Raffles Museum, of which five are still in its collection. The other two were sent to the New York Museum of Natural History in 1947. In 1938-40 the Christmas Island population was 500-750 breeding pairs (Gibson-Hill, 1947: 95). This figure almost certainly represents the world total at that date.

1. No. 9 prepared 1948, completed and submitted December 1949. No. 10 prepared and submitted December 1949. Nos. 11 and 12 prepared 1944-45 and 1947-49, completed and submitted January 1950. No. 13 prepared and submitted February 1950, and No. 14, May-July 1950.

2. Assumption Island, Lat. $9^{\circ} 45-48'$ S., Long. $46^{\circ} 30-31'$ E. Christmas Island, Lat. $10^{\circ} 25-34'$ S., Long. $105^{\circ} 34-46'$ E.

There are no reliable records of the occurrence of this bird in any other localities. Wood-Jones (1909: 140) describes *Sula abbotti* as breeding on bare ground on the island of North Keeling, approximately 530 miles west of Christmas Island, but there can be no doubt that he confused this species with *S. dactylatra*, which he does not mention. I spent the first 10½ months of 1941 on the Cocos-Keeling Islands. At that time *Burong Gangsa* (Coose Bird), which he gives as the Malay name for *abbotti*, was being applied to the Masked Booby. The latter was also then nesting in small numbers in the area where Wood-Jones, who did not collect any specimens for examination, claims to have found *abbotti*. Finally *dactylatra* must almost certainly have been there at the time of Wood-Jones's visit as Hume (1877: 310) mentions a specimen or specimens from the "Cocos, or Keeling Islands" in his review of the genus *Sula*. Unfortunately Wood-Jones's record has been quoted in later lists, including Chasen (1935: 65).

(a) the Assumption Island colony.

The existence of Abbott's Booby on Christmas Island is well known and well documented. So also is the fact, reported by Andrews (1900: 44), Tweedie (in Chasen, 1933: 69) and the present writer (1947: 119-21), that there it habitually nests in the crowns of tall trees on the slopes of the inland plateau. The sites are well in from the coast and at a height of 500-800 feet above the sea. This preference, to which it seems to adhere rigidly, is of some interest in itself. It is even more surprising when one comes to consider the nature of the Assumption Island colony, which must have been situated fairly close to the sea and at no great elevation above it.

Assumption Island lies about 20 miles south-east of Aldabra and some 200 miles north-west of the north point of Madagascar. It is a single crescent-shaped island, about 3½ miles from north to south and just over a mile across at its widest point. Brief descriptions of it are given by Abbott (1893: 763), Nicoll (1908: 100-13) and Fryer (1911: 431-33). It is, apparently, an elevated coral reef. Much metamorphosis has occurred in places in the interior of the island, but according to Fryer corals in position of growth can be seen at a number of points, especially along the northern portion of the east coast where there is a line of cliffs rising about 10 feet above sea level. Its surface is fairly flat and nowhere does it reach an altitude of more than about 20 feet except at the south-east corner, where Fryer and others report a short ridge of sand-dunes with a maximum height of about 90 feet. According to their accounts the vegetation is largely a low, bushy scrub set with a few stunted trees of *Euphorbia abbotti* and a *Ficus* sp. *Pemphis acidula* is restricted

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Assumption Island, Indian Ocean, reproduced from the map given by Fryer (*Trans. Linn. Soc. Lond.*, 2nd series, Vol. 14, pt. 3, 1911: 431):

to the neighbourhood of the west coast, and even there the bushes are scattered and do not form the usual thick banks. A long narrow strip of ground on the east side of the island, running north from the area of the sand-dunes, is said to be covered with a layer of guano and virtually devoid of vegetation.

Unfortunately there is little reliable information available on the Assumption Island colony of *abbotti*. Abbott himself makes a peculiar error in relation to it. He labelled the type specimen "Assumption Island", but in the rough description of the island which he sent to Washington (1893: 763) he makes no mention of the presence of the new booby. On the other hand in his description of Glorioso (about 100 miles south-east of Assumption and 90 miles from Cape Amber, Madagascar),

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which he visited on the same expedition, he says "Among (the) sea-birds there is a booby, which seems to be peculiar to the island. They breed in large numbers upon the "fouche" trees, in company with frigates and common boobies." (Abbott, 1893: 764). Ridgway added a footnote to this which reads, "Two species of boobies were collected by Dr. Abbott, *Sula cyanops* and *S. piscator*, but both of these are of very wide distribution"; the present names accepted for these birds are *Sula dactylatra melanops* and *Sula sula rubripes*, the first nesting on the ground and the second in trees or bushes. A first reading of these passages suggests that Abbott put the wrong locality label on the skin which he sent back to Washington, and that his booby was actually taken on Glorioso. The latter island would certainly seem to be rather more suitable for it in the light of its nesting preferences on Christmas Island. The assignment to Assumption is, however, repeated in an MS note by Abbott, published later by Ridgway (1895: 521), which says "A few breed on Assumption. Said not to be found on any other island in these seas".

The next naturalist to visit these islands was J. M. Nicoll. He landed on both Glorioso and Assumption in March 1906, while on a collecting trip with the Earl of Crawford in the *Valhalla*. He was an excellent ornithologist, but unfortunately his sections (1908: 100-13) on the two islands are extremely scrappy. Nowhere does he make any mention of the rare booby. The party had only one day ashore at each place, but even then the omission is surprising. Nicoll notes the presence of several other sea birds, and even gives a photograph of the common and widespread Redfooted Booby on its nest. He also tried hard to collect specimens of such indigenous land birds as were known to be on the islands; and when he reached Aldabra, on 14 March, he took great pains to see and photograph Abbott's Ibis, *Ibis abbotti*, a bird described by Ridgway on the same page as *Sula abbotti*. The only possible explanation is that only a few examples were present and that Nicoll, having accepted Ogilvie-Grant's reduction of *Sula abbotti* to a synonym of *S. cyanops* (in Sharpe and Ogilvie-Grant, 1898: 431), did not think it worth bothering about them. On the other hand he ought to have been aware that Sharpe had resuscitated *abbotti* (in Andrews, 1900: 44), and that only two specimens were then known. Abbott's Booby is apparently strictly sedentary, and as two adults were taken by J. C. F. Fryer, the next visitor to Assumption, in 1908 or early 1909 a few examples at least must have been on the island in 1906.

Fryer stayed in the Aldabra group from August 1908 to February 1909. In his account of Assumption (1911: 431-33) he mentions "a gannet (*Sula abbotti*) which is peculiar to

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Assumption and Christmas Island (Indian Ocean). On Assumption it inhabits the large dune, never descending to low parts of the island, and only going a few miles to sea to fish; it was never seen on Aldabra." According to the Librarian of the Linnean Society of London (*in litt.*, 14 September, 1949) Fryer brought back two skins which are recorded by the British Museum as "Gray, Handbook of Birds, Vol. 3, genus 2903, and species 11104 and 11105". They were placed in the Zoology Museum at Cambridge, and through the courtesy of Dr. H. B. Cott I have been able to examine them. Without question they are adult *Sula abbotti* in fairly fresh plumage, and differing in no appreciable way from the series of Christmas Island *abbotti* now in the Raffles Museum collection. Fryer does not appear to have published any notes on the Assumption birds beyond the extract given above. Seemingly he was not particularly interested in them, as in a footnote to his account of the island, published two years after his return to England, he admits that he had still not compared his specimens of *abbotti* with examples from Christmas Island.³

I can trace only two other published notes on the boobies of Assumption. These are by Betts and Vesey-Fitzgerald, both of whom visited the island in the late 1930s. Neither found *abbotti* there, and in both cases they write from information supplied to them. Betts (1940: 501-02) says,

"It is doubtful if a single young one (of Abbott's Booby) has been reared for years. I was told that no nesting had been attempted since 1930 and that, though one or two old birds continued to frequent the island for some time, none had been seen since 1936, and it is feared that the last one has died".

Vesey-Fitzgerald (1941: 521) says,

"On Assumption this bird nested in bushes on a big sand dune. The island has for many years been worked for guano and the labourers have wrought havoc among the birds. A single individual of this interesting species, which had been mateless for many years, is said to have finally disappeared about 1926".

³. It is extremely fortunate that Fryer collected the two skins of *abbotti* as his knowledge of the Sulidae is not impressive. In his account of Aldabra (*tom. cit.*: 420) he says "the usual species is the redfooted *Sula leucogaster*, but *Sula piscator* (*Cyanops*?) and *Sula capucina* also occur". It is his *Sula piscator* (= *S. s. rubripes*), not *leucogaster*, that has red legs and feet, and *cyanops* (= *S. d. melanops*) should never be confused with it on the ground; the latter, apart from the colouring of the soft parts, which is most distinctive at close quarters, and its more massive build, always rests on the ground and *Sula sula* almost invariably in trees or bushes. *Capucina* I cannot trace in any standard work, but the word is given by Abbott as the Creole for the Brown Booby, *Sula leucogaster*, which it fits well enough.

These two accounts give a discrepancy of ten years in the date when the last bird was probably seen. Apart from this they tally fairly well, and are obviously based on a common local belief.

Two points emerge from the accounts summarised above. One is that the two skins collected by Fryer provide us with the only definite evidence that we have that *abbotti* was once resident on Assumption. Glorioso would seem to have been a more suitable island for it, and the confusion arising from Abbott's conflicting statements forces one to treat his evidence with caution. Nicoll's silence on the subject could also be taken as suggesting that the colony was on Glorioso. Assumption was still uninhabited in 1906 and apparently not troubled by the guano-collectors who now work it regularly, but he found Glorioso settled by a Frenchman who had taken a lease of the island. He was growing maize for food, and clearing as much of the natural vegetation as he could to cultivate coconut palms. Even at the time of Abbott's visit in 1892 many of the large trees had been cut down, though the island was not then inhabited. If *Sula abbotti* had actually been on Glorioso in 1892 it would have had ample grounds for leaving, or at least being very scarce, by 1906. In addition Nicoll's examination of Glorioso was slightly disturbed by the presence of the Frenchman. It was, therefore, more perfunctory than his investigation of Assumption, which he searched sufficiently thoroughly to find three birds (a ground-cuckoo, a turtle-dove and a heron) apparently new to science. Finally it should be remembered that the race of the Masked Booby, *S. dactylatra*, inhabiting the western Indian Ocean sometimes breeds in immature plumage, as Moreau has recently and so ably shown (1940: 52). On Latham Island, off Dar-es-Salaam, there is a colony in which about one-third of the birds nest in mottled dress. Such individuals might easily be thought to be specifically distinct from the normal adults, and they do actually resemble *Sula abbotti* more nearly than they do adults of their own species. Neither Betts nor Vcsey-Fitzgerald actually saw specimens of Abbott's Booby on or from Assumption, and Wood-Jones has shown us that it is possible to mistake the Masked Booby for it if the material is not examined critically.

The second point that emerges from the published notes on the Assumption Island boobies is the difference between the nesting site that the birds are forced to use there and the one that they select on Christmas Island. Low, straggling bushes on a sand dune 60 (Nicoll, 1908: 107) or 90 (Fryer, 1911: 432) feet above sea level is a poor substitute for the crowns of the tall jungle trees on the plateau slopes on Christmas Island. But

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it is significant that this species, like the much more widespread Redfooted Booby, apparently deliberately seeks a site off the ground, even if it is at a low elevation. Murphy (1936 (2): 865-66) shows well that there is only one record, in the vast number of references to it, of the Redfooted *Sula sula rubripes* building anywhere other than in woody vegetation. This is Hanna's statement that on an island in the Revilla Gigedo group, off the coast of Mexico, these birds nest chiefly on platforms, 1-2 feet in height, built up of grass stems. There are even cases where *rubripes* has apparently deserted localities otherwise favourable to it when the last tree disappeared from them. We have only two recorded colonies of *Sula abbotti*, but seemingly it exhibits the same rigidity of behaviour.

(b) the Recorded Specimens.

A brief reference to the known specimens of Abbott's Booby has already been made at the beginning of these notes. It will be seen that apparently no collector has taken an egg, chick or young bird. The only account of the immature plumage is that given in the present writer's field notes on the birds of Christmas Island (1947: 121). These were based on observations made with the aid of binoculars on three developing youngsters in seemingly inaccessible nests. At the time it was not appreciated that no bird had ever been taken in a first juvenile plumage, and no attempt was made to collect one of them, but it is very doubtful if they could have been reached by any normal means. The nests were situated in the crowns of tall trees, 80-90 feet high, rising slightly above the general woody cover on a steep jungle-clad slope. The newly hatched chick is naked, as in the other boobies, and dull grey in colour, with the face and bill a little darker than the body. The down is long, pure white and apparently thickly placed. Such juvenile feathers as were seen suggest that the first plumage is an uneven, rather brownish grey on the back, and paler and more mottled on the under parts. The rectrices and remiges are almost black. During the whole of my stay of two and a quarter years on Christmas Island I never saw a bird on the wing that I felt sure was a juvenile Abbott's Booby. This was most unfortunate, but not very surprising. The great majority nested in the region furthest from the settlements, the immature forms of the other two boobies are much less plentiful than the adults on this island, and *Sula abbotti* is itself relatively scarce.

The type specimen is well described by Ridgway (1893: 599-600; reprinted 1895: 520-22), but unfortunately the measurements are given in inches (tail 8.40", wing 18", tarsus 2.00").

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and culmen 4.40"). The other fourteen recorded adults are as follows:—

Coll. No.	Date	Collector	Sex	Total Length in the flesh	Tail	Wing Flut	Tarsus	Exposed Culmen
<i>(Assumption Island; specimens at Cambridges)</i>								
..	..	Fryer ..	..	..	247	447	..	112
..	..	Fryer ..	..	..	227	462	..	115
<i>(Christmas Island; specimens in British Museum; J. D. Macdonald, in litt.)</i>								
1898.9.16.49	Oct. 1898	Andrews	M	..	223	432	..	108
1909.5.2.3	13-8-08	Andrews	M	..	219.5	436	..	109
1909.5.2.4	14-8-08	Andrews	F	..	224	437	..	110
1909.5.2.5	12-8-08	Andrews	F	..	231+	462	..	116
1909.5.2.6	28-8-08	Andrews	F	..	230+	458	..	115
<i>(Specimens now in the Raffles Museum)</i>								
Tw 56	2- 9-32	Tweedie	M	772	247	436	43	109
Tw 55	1- 9-32	Tweedie	F	787	265	460	45	113
Tw 57	2- 9-32	Tweedie	F	761	249	435	47	111
Tw 58	2- 9-32	Tweedie	F	787	248	458	48	110
Al	10-11-40	Gibson-Hill	F	785	203	447	43	112
<i>(Chasen, 1933, p. 68, also records) 4</i>								
..	..	..	M	761	200	441	42	110
..	..	..	F	770	203	450	45	112

Andrews describes the soft parts as: eye, very dark; feet, grey with black webs. Tweedie gives: iris, dark brown; bill, light pinkish grey with the tip dark brown, or bluish grey with the tip blackish; and the legs and proximal half of the feet grey green or greenish-bluish grey, with the distal half of the feet blackish. The present writer's field notes give the colouring of the adult soft parts, the same in both sexes, as: iris, dark brown; eyelids, black with a small bluish green area on the lower lid; bill, fleshy white to fleshy grey or green, with the tip almost black; bare skin of the face, dark dull grey, almost black, except for the inter-ramal skin and the base of the mandible which are a pale bluish green; tarsus and proximal two joints of the toes and webs dull, slightly greenish grey, with the web more slaty and darker, almost black, along its free border.

4. The total length given by Chasen is "total length in the flesh". The other measurements were made on the skins in the Raffles Museum. The tail is described as "from base of central feathers"; he gives 200 mm. for No. 56, 206 mm. for No. 55, 203 mm. for No. 57, and 213 mm. for No. 58.

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Before me are the two skins taken by Fryer on Assumption Island, the five skins from Christmas Island still in the Raffles Museum collection and detailed notes on Andrews's Christmas Island skins kindly supplied by J. D. Macdonald. In general this series fits the description given by Ridgway most satisfactorily except for a few minor points. As there is no appreciable difference between the Assumption birds and the undoubted adults from Christmas Island, it would seem to be of value to draw attention to these points, in spite of their relative insignificance, in addition to making one or two general comments. It may be some time before so much material is gathered together again.

Under the heading of specific characters Ridgway defines *abbotti* as "Most like *S. cyanops*, Sundevall, but bill much more robust, and colouration different, the prevailing colour of the wings and tail deep black instead of grayish brown, the wing feathers (both remiges and coverts) with inner webs and bases largely and abruptly pure white, and the upper tail-coverts and flanks marked with guttate or wedge-shaped spots of black". Comparing the present series with specimens of *S. dactylatra bedouti* from North Keeling the bill does not appear relatively more robust at its base. On the other hand it is certainly larger, the downward curve of the upper mandible at the tip is more marked, and the dorsal surface in this region is strongly keeled; in addition the serrations on the cutting edge are coarser and continue further back towards the gape. The prevailing colour of the wings and tail in the undoubtedly fully adult specimens (Assumption and Christmas Island Nos. 56, 57 and A1) is certainly a deep black, but this is not so in Nos. 55 and 58. In addition the brownish black areas in fresh plumage *dactylatra bedouti* are so dark as to appear almost black. The great difference in the colouring is that *bedouti* has the lesser and median coverts, including the angle of the wing, white; whereas in *abbotti* these feathers, as Ridgway points out, are black with the base white. In the field the predominant difference is the much larger extent of the dark colouration, certainly not its shade. Finally the flank feathers often have the dark spot triangular in shape and confined to one web, not placed medially. The fully adult birds in the present series also show several small differences from Ridgway's description of the type specimen. The white area on the greater coverts is restricted to the basal half of the inner web, and is also repeated at the extreme base of the outer web; this is not quite the same as having these feathers "with inner webs pure white, except at tip". The outermost primary has the outer web black not white, and the

shaft of both it and the next are a dark yellowish horn.⁵ The white at the free end of the outer tail feathers is never more than an abrupt, very narrow border at the extreme tip, while in the majority of cases, and always in the innermost pairs, the end is entirely black.

As stated above two of our birds (Nos. 55 and 58; ?also B.M. 1909.5.2.5, and 1909.5.2.6) have the dark areas on the wings and scapulars much paler than the others. Chasen (1933: 69) assesses these birds as adults moulting from worn to new plumage. This does not seem acceptable to the present writer. The tails are undoubtedly in the condition of fully adult birds, but the wing and scapular feathers appear to be in the process of moulting from a late immature plumage to the final one. The older coverts, much worn, have their dark areas no darker than a medium drab. Normal fading in a year could scarcely have reduced the adult black to this condition. Further the new coverts appearing along the front edge of the wing are not black, but a very dark umber. That is to say they are appreciably paler than in the fully mature adult birds. In addition the areas of dark tipped feathers on the flanks are rather larger and less well defined. A number of feathers on the edges have only an indeterminate dark flecking at the free end.

It would seem from the above measurements that the females are in general slightly larger than the males, though no difference has been noted in the colouring of the soft parts.

		Total length*	Tail	Wing flat	Tarsus*	Exposed Culmen
Males, range	..	761-772	200-247	432-441	42-43	108-110
average	..	766.5	222.4	436.3	42.5	109
Females, range	..	761-787	203-265	435-462	43-48	110-116
average	..	777.2	232.0+	450.9	45.6	112.4

*Males 2, females 5 only. Other measurements based on males 4, females 8, as in table on page 72. Fryer's two skins are not sexed, but judging by these figures they are females.

(c) Field Identification.

The fully adult bird can be distinguished from any other white booby in the Indian Ocean by the almost completely black upper surface to the whole wing (as opposed to *bedouti* where the lesser and median coverts are white), by the white on the inner web of the secondaries which gives this portion of the wing a striped appearance in the air, and finally by the mottling on the posterior part of the flanks. All three points are surprisingly apparent when the bird is in flight. The greater area of

⁵. The solid portion of the shaft is black in all the rectrices and remiges in an adult *S. dactylatra bedouti*.

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dark on the wing can also be seen in a resting bird, but the effect is less striking. On the other hand at such times the more subdued colouring on the face and bill are noticeable; the strong yellow bill and black facial mask of *bedouti* produce an effect bordering on the ludicrous which seen once can never be forgotten. Finally, so far as we know, the Masked Booby invariably alights and nests on the ground, while *abbotti* would seem to be essentially a tree-tied bird like *Sula sula*.

As we have shown there is no full account of the early juvenile plumages. If, as seems probable, the two examples of *abbotti* noted above represent approximately the final immature plumage its field characters are to all intents and purposes the same as those of the adult bird. The only mistake that might be made would be to confuse a late immature *dactylatra* with it. The following differences should be apparent. It seems that in *dactylatra* at least the dorsal part of the head retains a brindled ash-brown colouring until the bird is mature. In addition the median and lesser coverts begin early to acquire an ill-defined white edging which makes these areas appear as if strongly settled with hoar frost. Finally the flanks are white in *bedouti*, though at this stage the feathers of the rump have ill-defined smoky centres. This gives an appearance very different from the white rump and sharply-spotted flanks and upper tail-coverts of *abbotti*; the markings in this area differ in positioning and in quality. *Abbotti*, as we know it, is always a bird of sharp colour contrasts in the plumage, but relatively subdued distinctions in the soft parts. The difficulty would seem to be to separate a first plumage *abbotti* from an early *dactylatra*. On this point the present writer can give no information. There was certainly no booby on Christmas Island with which any stage of the heavily-built *abbotti* could be confused. But it might well be that there is no sound character for separating it from the young *dactylatra* in the field.

Ridgway (1895: 522) gives figures, based on a very limited series, showing his single *abbotti* to be noticeably larger than *S. cyanops*. Actually the measurements given here for it are on the whole smaller than those for twelve *S. dactylatra bedouti* measured on North Keeling (see Gibson-Hill, 1950: 231), except for the exposed culmen. At the same time his contention that the tarsi are relatively shorter and the toes longer is upheld by the material examined for this paper.

Summary

This paper gives a short summary of the information available on Abbott's Booby, *Sula abbotti* Ridg. Only two breeding grounds have been discovered, Assumption Island (the type locality) and Christmas Island, both in the tropical Indian Ocean. This species must now be considered to have disappeared from the first of these localities. The Christmas Island

colony had a population of 500-750 breeding pairs in 1939-40, which almost certainly represents the world total at that date. An account is also given of the 15 known specimens, 7 (Assumption 2, Christmas Island 5) of which were examined by the author; detailed information on a further 5 adults from Christmas Island was supplied by the authorities at the British Museum. The note finishes with a summary of the field characters of the adult, based on experience gained on Christmas Island.

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ALASKA WILLOW-WARBLER IN THE MALAY PENINSULA

No. 10. A note on the Alaska Willow-Warbler, *Phylloscopus borealis* (Blasius) in the Malay Peninsula.

When I was compiling the recent checklist of the birds of Malaya it seemed to me that the only race of the Arctic Willow-Warbler, *Phylloscopus borealis* (Blasius), which could be said with certainty to be reaching the area covered by the list is the typical one (1949: 202).⁶ At that time the only information available here on the Alaskan race, *P. b. kennicotti* (Baird), was that provided by Ridgway (1904: 696-97) and Ticehurst (1938: 131-32), and the brief reference to the possibility of its occurrence in the Philippines published by Amadon and Jewett (1946: 5-17). All three notices give *kennicotti* as smaller than the typical *borealis*, but taken together they present a confusing picture of any possible colour differences. Ridgway says that the upper parts are decidedly greyer in *kennicotti*, at least in spring and summer, and the under parts less strongly tinged with yellow. Ticehurst, on the other hand, refers to three birds from Alaska which appear to be yellower, not less yellow, on the under parts. Amadon and Jewett say of a possible example from the Philippines that it is "buffy and rather short-billed, suggesting that it might be the Alaska Willow-Warbler....." A careful examination of the material in the Raffles Museum collection showed that while a number of the skins are small they cannot be said to differ appreciably in colouring from obviously typical *borealis*. In view of the apparent uncertainty with regard to the characters of *kennicotti*, and the doubt cast by Ticehurst on the validity of the race, no attempt was made then to claim that it winters in Malaya.

More recently Parkes and Amadon (1948: 86-87) have reviewed the problems of the identification of *P. b. kennicotti* and the determination of its wintering range. These authors rely largely on wing length (measured flat). On this they refer wintering males with a wing length of less than 65 mm. to *kennicotti*. Two males with wing lengths of 65 mm. they consider to be intergrades, though they feel that they are more likely to be large *kennicotti* than small *borealis*. This is consistent with the findings of Ticehurst (*tom. cit.*: 124) who examined 478 examples of the typical race; he gives a wing length of 65-72 mm.; exceptionally over 70, for males and (58.5, 61.5) 62.5-66 mm. for females. Unfortunately Parkes and Amadon do not attempt to define their dividing line for female birds.

Working on the criterion outlined above, Parkes and Amadon consider twelve male specimens which they have examined to be definitely *kennicotti* (wings, 60-64; average

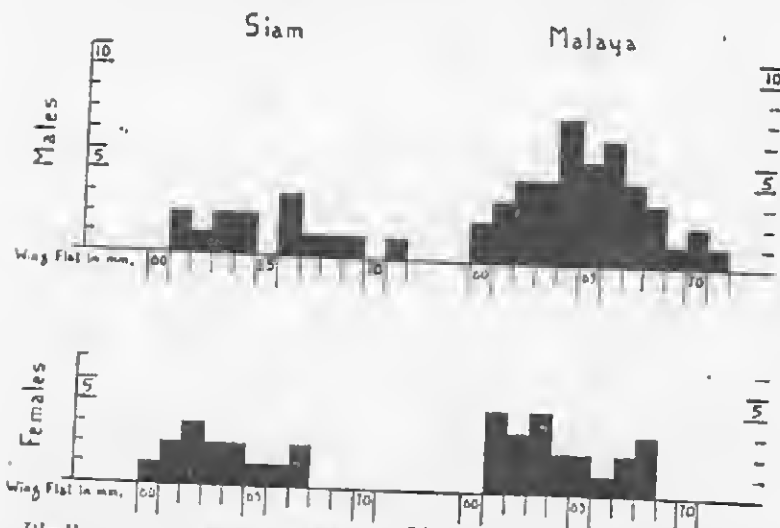
⁶ The territories of the Federation of Malaya and the Colony of Singapore.

62.2 mm.). Five of these were taken on Luzon, in the Philippine Islands, during the months of September, October, January, March and April. From a total of 30 Philippine specimens, including male, female and unsexed birds, they assign 12 (Luzon and Palawan) to *kennicotti*. Other non-breeding localities from which they have seen specimens which they would refer to this race are given as eastern China (Shantung and Yunnan), Peninsular Siam (Nongkok), the Malay States (Kedah Peak), Celebes and Selaynr Island, south of Celebes. The two male specimens with a wing length of 65 mm., referred provisionally to *kennicotti*, were from Luzon and Buru Island, in the Moluccas. In conclusion the authors point out that although two-fifths of their Philippine specimens of *P. borealis* are apparently of the Alaskan race only 3 out of 55 examples from the East Indies seen by them can be referred to it. "It seems reasonable, therefore, to assume that the Philippine Islands represent an important, if not the principal, wintering area for *kennicotti*."

The Raffles Museum collection contains approximately 109 skins of *Phylloscopus borealis*. Of these 71, of which 8 are not sexed, were taken on the mainland of the territory of the Federation of Malaya, or on the adjacent off-lying islands, and 28 in peninsular or south-west Siam. The dates range from the end of August to 15 May. The remainder come from Borneo (North Borneo 3, Sarawak 3), the Anamba Islands in the South China Sea (3) and East Java (1, ♀ wing 62.5 mm.). The two series likely to be of value are those from Malaya and Siam. The wing lengths (measured flat) are shown graphically in the accompanying text figure. If we accept the criterion of Parkes and Amadon and agree that males with a wing length of less than 65 mm. should be ascribed to *kennicotti* we find that 20 out of the males from Malaya are of this race, 5 are possible intergrades and only 17 are unquestionably typical *borealis*; the corresponding figures for the series from Siam are 7, 0 and 7. If the measurements for female birds are considered we find that we have 7 Malayan skins with a wing length of less than 63 mm., 4 at 63 mm. and 10 lying between 64-68 mm. The Siamese figures are 6 below 63 mm., 2 at 63 mm. and 6 from 64-67 mm.

Phylloscopus borealis as a whole occurs widely and in some numbers in suitable areas throughout the Malay States from late September to early April. If the figures outlined above are accepted it must be taken that at least half the birds belong to the Alaskan race, and this region must be accounted at least as important as the Philippines as a wintering area for it. Less is known about southern Siam and the Siamese portion of the peninsula. Riley (1938: 433) says that *borealis* has been taken practically all over the country south to Patani, but Deignan (1945: 475) quotes only one record (11 September,

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Phylloscopus borealis (Blasius): wing lengths, measured flat, of the specimens in the Raffles Museum collection from Siam (on the left) and the Federation of Malaya (on the right).

1936) for northern Siam. Presumably the birds normally keep to the southern portion of the country. In this area it would seem that *kennicotti* occurs in about the same proportion to the total population as it does in Malaya. This point is of interest when we come to consider the route by which the birds are reaching the southern portion of the peninsula. Without doubt some of the other species wintering in Malaya arrive by way of the north-west coast of Borneo and/or the islands straddling the southern portion of the South China Sea. Unfortunately we have few skins of *borealis* from this region; their wing lengths are as follows:—

North Borneo	♂ 70 mm.	♀ 63 & 67 mm.	?1 <i>kennicotti</i> , ♀.
Sarawak	♂ 67 & 68 mm.	♀ 67 mm.	all <i>borealis</i> .
Anamba Islands	♂ 63 & 64 mm.	♀ 68 mm.	2 <i>kennicotti</i> , ♂ & ♀.

Presumably therefore some Alaskan birds are coming by this route, probably from the Philippines, but on the limited amount of material available it would seem that the proportion is small. On the other hand we can say definitely that a number of individuals of *P. b. kennicotti* are travelling down the west side of Malaya and by way of the islands of the Malacca Strait. Presumably these must have come across southern Siam and Indo-China. It is not possible to make a direct comparison between the strengths of the migratory streams on the two flanks of the peninsula, as nearly all our collecting has been done on the west side and its off-lying islands. Unfortunately, also,

Mus., 23, 1950.

5 out of the 10 *Phylloscopus* taken on the east side are unsexed; 2 of these have wings of 63 mm., one of 64 mm. and one of 65 mm.; they might, therefore, be males of *P. b. kennicotti* or females of the typical race. The remainder provide 2 examples of *kennicotti* (♂ 62 and 64 mm.; Kuala Tahan, Pahang), 2 of typical *borealis* (♂ 67, ♀ 67 mm.; Horsburgh Lighthouse and Pahang), and a male with a wing of 65 mm., probably *kennicotti*. Of the 37 males from the west side of the southern portion of the peninsula, 18 have wings of less than 65 mm., 4 of 65 mm. and 15 of 66-71 mm.

A. C. V. van Bemmelen has most kindly supplied me (*in litt.*, 16 December, 1949) with the wing measurements of the specimens of *P. borealis* in the Buitenzorg collection. They total 34 skins from various localities from Sumatra eastwards to Flores. On the criterion established above only one specimen can be attributed with certainty to *kennicotti*, a female (wing flat 61.9 mm.) taken at "Punt D above Long Petah", Central East Borneo. Two males (wings 67.3 and 67.8 mm.) from the same locality are undoubtedly typical *borealis*; a second female (wing 63.2 mm.) is intermediate. Three unsexed specimens (wings 63.0, 63.8 and 65.6) from Lebanghara on the Serawai River, Central Borneo, cannot be classified satisfactorily. For the rest, as we have noted, the Buitenzorg collection gives no indication that *P. b. kennicotti* reaches the Greater or Lesser Sunda Islands. Certainly it cannot be doing so in numbers in any way comparable to the populations apparently wintering in the Philippines and the Malay Peninsula.

To sum up. If one accepts the proposition put forward by Parkes and Amadon that males of *P. borealis* with a wing length of less than 65 mm. should be ascribed to the Alaskan race, *kennicotti*, and that individuals with a wing of 65 mm. probably belong to it, it would appear that about half the examples of this species reaching the Malay Peninsula are of this race. Further it seems probable that a large proportion of these birds are approaching by way of the southern fringe of the mainland of Asia, and not across the southern portion of the South China Sea or the coast of Borneo. We still have no evidence that *kennicotti* moves on to Sumatra or Java, though presumably strays must be reaching these regions.

Phylloscopus borealis xanthodryas Swinhoe.

Chasen (1935: 250) says "Some of our previous records of *xanthodryas* from various parts of Malaysia, and those of some other authors, we now consider as very doubtful We have, however, seen birds from Borneo quite clearly belonging to *xanthodryas*". These latter specimens are not now in the Raffles Museum collection, which in 1948 contained no examples of *xanthodryas* (Gibson-Hill, 1949: 202). More recently I have

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been examining some non-incorporated material from Borneo and find among it a skin taken "between Victory Island and (the) coast of Borneo" by Commander A. W. Sprott on 5 October, 1941.⁷ It is, I think, unquestionably an example of *xanthodryas* and it would seem to be of interest to put it on record here. It is identified as a male. The wing flat measures 76.5 mm., and the first primary exceeds the primary coverts by about 2 mm. It is a little brighter above and slightly yellower below than a number of our skins of typical *borealis*, but it could not be picked out from the remainder on these characters. The under wing coverts, however, are noticeably buffy and the axillaries a fine light lemon yellow.

Ticehurst (1938: 131) accepts wintering examples of *xanthodryas* from the Middle Riu Kiu Islands (one), Palawan and Luzon in the Philippines, North Borneo, Labuan and Sarawak in Borneo, the Anamba Islands, West Java and Sumatra. There do not appear to be any reliable records from Indo-China, Siam, Burma or the Malay Peninsula. Deignan identified a unique female from Chiang Mai, altitude 1,000 feet, which he took on 27 October, 1935, as *xanthodryas*. Ticehurst who examined the specimen subsequently decided that it is more likely to be *P. b. examinandus* Stresemann, and recently Deignan (1945: 475) lists it under the latter name. There are relatively few records but it would seem that this race of the Arctic Willow-Warbler, unlike *kennicotti*, is travelling south by way of the Philippines and then along the south east side of the South China Sea rather than by way of the coasts of the Gulf of Siam.

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⁷ Victory and Barren Islands, Lat. 1° 32' N., Long. 106° 26' E., lie about 75 miles south of the southernmost part of the Anamba group, and approximately half way between Singapore and the coast of Borneo. Victory Island, which is wooded and rises to a height of 285 feet, is a good landmark for vessels running between Singapore and the mouth of the Sarawak River.

No. 11, Nesting notes on the Malayan Longtailed Tailor-Bird,
Orthotomus sutorius maculicollis Moore.

The Longtailed Tailor-Bird^a occurs widely throughout the lowlands and foothills of the Malay States. Its favourite haunts are areas of scrub vegetation, gardens and orchards. In these and similar habitats it is the commonest of the tailor-birds in the western states at least, and on the islands of Penang and Singapore. It is by no means a shy bird and freely takes up breeding territories in gardens inside the municipal limits of the larger towns. The greater part of the original field data recorded here was obtained in the Sime Road Internment Camp, on Singapore Island, in 1944-45; the remainder has been gathered subsequently in the Tanglin district of the town.

It is probable that this bird usually restricts itself to altitudes below about 2,500-3,000 feet, but it may extend its range upwards in suitable areas. Cairns (*in litt.*) reports it from the vicinity of the bungalow gardens on the crest of Penang Hill (circa 2,700 feet). Chasen (1939: 324) refers to breeding on the Larut Hills, Perak, at a height of over 3,000 feet. Bromley (*in litt.*) says that he has seen it at Jeriau Farm (circa 3,200 feet) on Frazer's Hill and that it is numerous in the cleared areas at the summit at altitudes up to 4,200 feet. The Raffles Museum collection includes unique males from Ulu Liang (3,500 feet) and Gunong Gapis (3,700 feet), both in Pahang. Edgar (*in litt.*) reports it at 4,500 feet at Cameron's Highlands and Berwick (1947: 39) as high as 5,000 feet.

General Habits.

This is a busy, perky little bird, with something wren-like in its movements. It is found in a large range of bushy and lightly wooded habitats, including unweeded rubber estates and open scrub. It is seen most frequently in or near cultivated areas and is probably commonest in orchards, gardens and the vicinity of kampongs. On the other hand it is not normally encountered in or near the mangrove belt, where its place is taken by the Ashy Tailor-Bird, *O. sepium ruficeps* (Less.). It feeds almost entirely on small insects, insect larvae and spiders. It appears to be very partial to ants and minute beetles. These are taken largely from among the taller plants and low bushes, but occasionally birds can be seen working over the lower branches of trees, particularly if they are in flower. It generally

^a No. 482 on the Malayan Checklist. Strictly Resident. The secondary sexual characters are not marked. The male bird is slightly brighter than the female, and for part of the year has the central tail feathers elongated 10-20 mm. beyond the remainder.

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feeds from inside the foliage covering, hopping energetically from stem to stem and rarely showing itself for more than a brief moment until it has to move on to the next feeding ground. Its flight is weak and seldom of long duration. While it is in the air it raises and lowers its tail energetically in time with its wing beats, as if it were pumping itself along. The tail is usually cocked up as the bird alights and it may be brought well forward over the back. It is in constant use as a counterbalance while the bird is moving in search of food, and at such times it is seldom still.

It is probable that a cock Longtailed Tailor-Bird maintains the integrity of its feeding territory throughout its adult life, but we still lack adequate data on this point. Certainly one never seems to see more than two mature birds in any particular small area at any time of the year, even in their most favoured and heavily populated habitats. There is, of course, no doubt that territories are held during the breeding season. Their size varies but they never appear to be much smaller than three-quarters of an acre, and they may be as large as 2-3 acres. While nesting is in progress the cock makes periodic feeding tours round parts of his area, calling loudly and stridently as he does so. He generally becomes noticeable two or three weeks before the eggs are laid. At first the series of calls are short, but they increase in length and volume while the hen is sitting and continue, waning slightly, until shortly after the young chicks have left the nest. Then there is a spell of several weeks during which his note is huskier and heard only at fairly wide intervals. After that he may begin a second brood, with renewed calling, or remain almost silent and be forgotten. In Singapore the birds start calling about the second or third week of December, towards the end of the autumn rains, and they can be heard in different areas from then on until August or September. In the case of one nest which was under observation the chicks did not leave until 18 October, and the cock was calling briefly to within a few days of the end of the month.

Voice.

The Longtailed Tailor-Bird has only one call, but there is considerable individual variation in the composition of the phrase and, as we have seen, in the intensity and frequency with which it is uttered. It is a shrill, strident disyllabic note which is repeated with monotonous regularity. The sound generally seems to lie between *whce-tē* or *chwee-tē* and *dēr-zeet* or *tēr-weet!* Molesworth (quoted in Madoc 1947: 90) suggests *dar-zee*. Herbert (1923: 98) gives *too-wit* for the birds nesting round Bangkok; this does not sound right unless his *i* is meant

to be very long. Deignan (1945: 488) says that *whee*, *weet*, *tu-wheet*' and *pee'-to* are among the variants that he has heard.² Smythies (1940: 154) gives *chw-ee* for the Burmese race, *O. s. patia* Hodgson.

During the nesting season the call is very loud and piercing for the size of the bird. Usually at this time a cock gives 30-60 calls in just under half as many seconds. Then he rests for 5-10 seconds. Sometimes he utters as many as 100-250 before he stops; long series, which are easier to measure, normally average 75-80 calls in half a minute. After about 10-20 sequences he is generally quiet for a much longer period, and may not be heard again for half an hour or more. He normally makes his first tour of the day shortly after sunrise, and goes on at intervals past the noontide heat to nightfall. Not unnaturally one notices it most in the early morning and round midday, when it seems strange at times that anything living should have so much energy. Like all his little brethren, he is very vocal when the weather begins to clear by day after heavy rain. As each call is uttered the lower throat swells and discloses the black bases of the feathers, and a small area of blackish skin on each side of the neck. This can prove a pitfall for the unwary as the only other species in this region which achieves the same stridency and regularity of note is the Blacknecked Tailor-Bird, *O. a. atrogularis* Temminck. In the latter bird the individual notes are shorter, harsher and monosyllabic, *dzee* or *dzeek* rather than the *dër-zeet*' or *tër-weet*' of the present species.

The number of calls to a sequence, and their pitch, drop after the chicks leave the nest. The notes are then huskier and the sequences short. In this form it is not so easy to identify it. Once he is well clear of his breeding worries the cock apparently emits no more than an occasional quiet chuckle of three to a dozen subdued notes. Probably the hen commits herself to this much self-advertisement at all times, but it is less easy to be sure of her behaviour in this respect. Birds flushed from the nest, or frightened when feeding, may utter one or two rather sharp, short calls, almost as though in anger, but often they go silently. Both the cock and the hen emit a soft single or double cheep when they reach the nest with food for the chicks. Apart from this the hen normally approaches it silently, while the cock calls loudly at intervals on his way there. Youngsters cheep softly when being fed in the nest, and sometimes almost continuously when they are following an adult round afterwards.

². The subspecific status of the Siamese birds is discussed in an Appendix at the end of this paper, see pp. 96 and 97.

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Breeding Season.

On Singapore Island the breeding season normally runs from the latter part of December to August or September, with occasional pairs still finishing during the first half of October. In this period two or three broods are reared in each territory. Not unnaturally the birds build a new nest for each brood; often it is only a short distance from the old one. Spittle (1950: 195) records nests found in the course of construction on the Changi Promontory from January to March and again in May and August; nests with eggs were found in April and August, and nests containing young in March, April and July; he saw post-nest juveniles accompanied by their parents in March, June and August. My notes give building in January (2 nests), February (3 nests), May (2 nests), July (2 nests), August (3 nests) and September (1 nest). Some of these were not successful and the nests were destroyed before the eggs were laid; the above figures do not include known second and third attempts. In addition I have records of nests found with eggs in February (2 nests), April (1 nest), June (1 nest) and August (2 nests).

It is probable that the birds follow approximately the same annual rhythm over at least the greater part of the Malay States, though the laying season may well stop a month or two earlier in this area. It does not, apparently, start later. Madoc (1947: 91), whose experience is based largely on Selangor, Kedah and the Kuantan district of Pahang, says that the breeding season may extend from January to June, varying according to the locality. Edgar (1933: 149) reports nests found in the Dindings district of Perak in February, April and May. Berwick (1940: 2) records a nest with young found at Parit Buntar, north-west Perak, on 11 February, and a second, almost certainly the work of the same pair of birds, on 1 April. Eggs in the Raffles Museum collection were taken in February (Selangor and Perak; Ryves), March (Selangor; Madoc) and July (Negri Sembilan; Ryves).

Further north the season would seem to begin later. Clutches from Bang Nara, in Patani, now in the Raffles Museum collection, are dated April, May (2), June (2), July (2) and September. Herbert (*loc. cit.*) says that in the neighbourhood of Bangkok nesting is carried on from early May to late August, with June and early July as the most popular period. Stuart Baker (1924: 411) and Whistler (1928: 123) give May to July as the principal breeding months for the typical race in India; Smythies (1940: 154) says the same for the Burmese race. Some Bangkok males begin their post-nuptial moult as early as the third week in July (R. M. specimens 14 and 18 July); presumably only one or two broods are reared each year in Central Siam, Burma and India.

The seasons are fairly distinct in Central Siam, and there, as Herbert points out, the Longtailed Tailor-Bird begins to nest at the start of the rains and finishes with them. Deignan (*loc. cit.*) writing of Northern Siam, says that one hears it calling "throughout the seasons of heat and rain". Further south, on the other hand, it apparently begins in drier weather. In southern Perak, where Edgar found it breeding from February to May, February is normally a very dry month, and the wettest periods are round April and October. Similarly on Singapore Island, where the dry and wet periods are even less strongly marked than they are further north, there are generally short, dry spells about January-February and July-August, with intermittent rain, heaviest from October to December, in the intervals between them. Here, therefore, the Tailor-Bird begins to nest at the end of the wetter weather, and runs on through the short dry phase, the long period of light wet weather and past the second dry spell, to finish just before it reaches the wettest months of the year again. In as far, that is, as there are definable rainy seasons in Singapore this bird nests during the worst of them, though in Siam proper, and probably also in Burma, it apparently confines its nesting to the period of heavy rains.¹⁰

Nest.

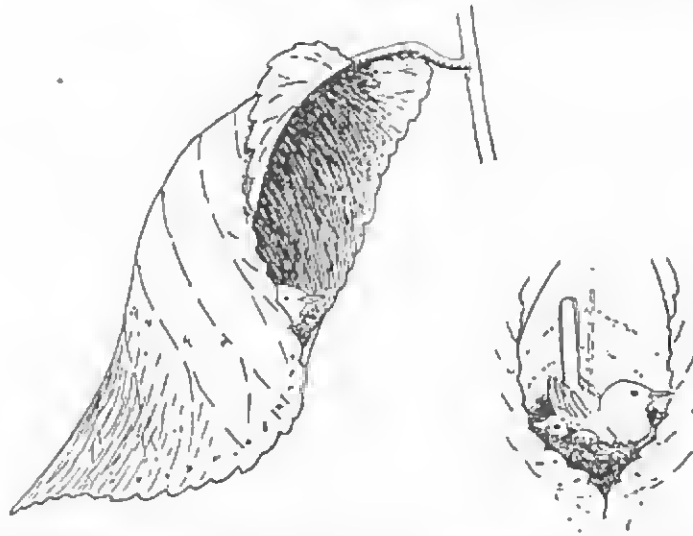
It builds a typical tailor-bird nest. In Malaya this is usually situated about 2-5 feet from the ground; the highest nest that I have seen was less than 7 feet above it. Herbert (*loc. cit.*), on the other hand, refers to nests in Wild Almond trees at heights of 15-20 feet, and Deignan (*loc. cit.*) says that all the nests that he saw round Chiang Mai were built in mango trees. I know of no Malayan records as high as this. Edgar (*loc. cit.*) says 3-5 feet from the ground; Spittle (*loc. cit.*) gives 2-6 feet; Madoc (*loc. cit.*) says that the nests are usually 2-3 feet up, but that sometimes they may be placed in the foliage on a low bough of a rubber tree; even the latter site keeps them within 10 feet of the ground. The birds are not particular about the plant that they choose so long as it has fairly broad, pliable leaves and is in the correct habitat area. In gardens they mostly make use of a croton-like bush, *Acrifolia* sp., a Canna or the Shoe-flower, *Hibiscus rosasinensis* Linné. Where vegetables are growing they frequently make use of leaves of Bayam, Brinjal or Guava saplings. On the edges of cultivated areas

¹⁰. There are two ways of viewing this last phenomenon. Deignan (*loc. cit.*) says the Longtailed Tailor-Bird "has a number of shrill, monotonous, and rather annoying calls, which are heard constantly, during even the hottest hours of the day, throughout the seasons of heat and rain". Smythies (*loc. cit.*) says that "its loud cheerful note helps to lighten the gloom of the teak forest during the rains".

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they are found most often in shrubs of Ara Perak, *Ficus alba* Reinw., Mahang Puteh, *Macaranga hypoleuca* Muell.-Arg., and, according to Madoc, Pokok Kabu Hutan, "a shrub which grows to a height of about four feet in unweeded rubber estates". The birds are seemingly not good judges of the suitability of particular leaves and failures are frequent. Sometimes the stitching tears through the margin of the leaf. In other cases the weight of the nest bends the leaf down too far and thus impedes the flow of sap along the petiole.

Apparently in southern Malaya a single leaf is used whenever possible. Seventeen of a total of 24 nests which I have examined were built on one leaf, 4 were made in the cradle between two leaves, 2 were enclosed by three leaves and 1 was



Nest of a Longtailed Tailor-Bird, *Orthotomus aitorius maculicollis* Moore, Sime Road, Singapore, August 1944.

attached to four leaves. The leaf serves to hide the nest, and to protect the sitting bird and the chicks from sunshine and rain. The latter effect is achieved much more satisfactorily if only one leaf is utilised, provided that it is large enough. Typically the margins of the distal third of the leaf are drawn together underneath it, and the nest constructed in the cup thus formed. Usually the combined weight of the nest and the sitting bird bend the leaf downwards and the proximal portion then provides a satisfactory shelter for it. When very broad leaves are chosen, as in a Canna or the Ara Perak, the bird generally fastens one margin to the neighbourhood of the mid-rib, and thus uses only

half the leaf. No set pattern is followed when two or more leaves support the nest, and the arrangement depends largely on their relationship to each other on the plant. According to Herbert (*loc. cit.*) the birds in the neighbourhood of Bangkok normally employ two leaves, not one. Whistler (*loc. cit.*), writing of the nominate race in India, again says that two or more leaves are used; "there is a great deal of variety in the method of sewing the leaves together; two large ones may be joined down their edges, several smaller leaves may be sewn together, or the nest may be slung between two or three leaves which are sewn to it and not to each other". Smythies (*loc. cit.*) says that the Burmese form also uses two or more leaves. Unless these authors have been confused by the fact that the bird may tack an adjacent leaf lightly to the almost finished structure (which is really built on only the one leaf), it would seem that the Malayan birds are behaving slightly differently from those further north.

At least the greater part of the building is done by the female. In the early stages the male merely patrols the neighbourhood, advertising his presence and his proprietorial interest in the matter. Later he not infrequently assists more practically by bringing and adding some of the material. The hen starts, as we have noted, by sewing the margins of the leaf, or two leaves, together to form an inverted cone. The edges are first brought into apposition by twisting a few strands of spider's web silk round the whole leaf. Next she pierces the edges and thrusts a small blob of silk through the hole. Then she withdraws her bill with the remainder of the silk mass in it, leaving the final residue on the side from which she started. The tension on the joining thread pulls the two blobs of silk into little hard lumps, which look superficially very like knots. Generally each stitch is made singly, but occasionally, after several have been inserted, the hen may thread one back to the opposite side of the leaf again. Frequently kapok is also employed for the stitching, but not, so far as I am aware, for the first few stitches. Usually she makes about 35-45 stitches, working quickly and rather jerkily in short bursts separated by wide intervals while she searches for more material. In the three cases that were watched at this stage the stitching was done in two days. From an examination of abandoned attempts it would seem that trouble is encountered fairly often at this stage. Sometimes the stitches tear through the margin of the leaf, while at others the increased tension, as the binding threads weaken, is too much for them. Spittle (*loc. cit.*) says that coloured darning wool, cotton-wool, lalang down and vegetable fibres may also be used for the stitching, but in all the nests that I have examined only insect or spider silk and kapok had been employed.

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Work is not begun on the nest itself until the stitching of the cone is almost or completely finished. Then the hen may pause for a day or two, or she may go straight on with the construction of the nest. On two occasions I have seen apparently satisfactory cones abandoned, and the nest built elsewhere. It is possible that the hen works at more than one leaf, or pair of leaves, at a time, and then ultimately builds in the one that seems most suitable. Once work is started on the nest itself it is usually finished, with a little help from the male bird, in about four days. The cup, which is neatly and fairly compactly constructed, is formed mostly of vegetable fibres, generally very fine grass or coco-nut bast, mixed with kapok or lalang down. The outside, where it is exposed, is normally covered with fine strands of spider's silk and camouflaged with small pieces of moss or other green vegetable fibres. The inside of the nest is usually lined with kapok or kapok and vegetable fibres, but there may not be enough of this material present to constitute an inner layer distinct from the core of the nest. The nest itself is frequently much thinner in the area where it is protected by the leaf and in this region may consist of only a few strands of fibre mixed with kapok. As construction proceeds the hen occasionally passes stitches through from the back of the leaf into the nesting material. The rim of the nest is fairly constant in size, with an external diameter of 60-70 mm., and an internal diameter of 45-55 mm. The depth varies considerably. Usually the cup is about 40-45 mm. deep, but it may be as much as 60 mm. Spittle gives $\frac{1}{2}$ -3 inches as the extremes that he has seen.

Eggs.

Sixteen clutches were examined; 9 contained 3 eggs, 5 contained 4 and the other two 2 each. Spittle says that the clutch ranges from 2 to 4, but gives no further details; Edgar says that in the Dindings the clutch is either 3 or 4. The Raffles Museum collection contains 5 clutches from the Malay States, 3 c/3 and 2 c/4. The 8 clutches from Bang Nara, in Patani, are made up of 1 c/2, 3 c/3, 2 c/4, and, interestingly enough, 2 c/5. Herbert says that the usual number of eggs in the neighbourhood of Bangkok is 4. Smythies says that the Burmese race lays 3 or 4 eggs, rarely 5 or 6. Stuart Baker gives 3-5, very rarely 6, for the nominate race in India; Whistler says that a normal clutch is 3 or 4, but 5 or 6 eggs may be found. Apparently the clutches further north are rather larger than those laid in our area. I can trace only one record of a clutch of 2 taken outside the peninsula,¹¹ while clutches of 5 and 6,

¹¹ Count Gyldenstolpe (quoted in Deignan 1945: 488) records a nest with two eggs found near Doi Pha Sakaeng, North Siam, on 22 July, 1914, but it may not have been a completed clutch.

which may occur in the north, do not appear to have been noted in the Malay States. Further it would seem that clutches of 3 are rather commoner than clutches of 4 in the southern part of the peninsula, but Herbert definitely gives 4 as the usual number in the neighbourhood of Bangkok. Against this must be set the fact that the breeding season is much shorter in the north, and the birds there can only be rearing one or at the most two broods in a year.

The eggs are egg-shaped, but rather elongated. The shell is thin, with the surface smooth and slightly glossy. In all the Malayan examples that I have seen, or that have been recorded, the ground colour has been a pale bluish green (étaine blue). Occasionally it is immaculate. Generally it is sparingly spotted and blotched with burnt sienna, sanford's brown or antique brown, with often a few sharp dots of chestnut. The markings are generally thickest at the broader end, and may be confined to it. Dimensions (30 eggs from Singapore Island north to Selangor); average, 15.3×11.3 ; max., 16.5×12 ; min., 14×10.5 mm. Stuart Baker (1924: 410-13) gives *maculicollis* 15.5×11.4 mm. (average of 50 eggs), *putia* 15.9×11.3 (average of 200 eggs) and *sutorius* 16.4×11.6 (average of 100 eggs), all without localities.

According to Cairns (*in litt.*) this bird is frequently the foster parent to the Brain-fever Bird, *Cacomantis merulinus* (Seop.). He describes the eggs of the latter as longer than those of the Tailor-Bird and white, sprinkled and zoned at the larger end with russet. This observation does not appear to have been brought forward by any other observer, but the Raffles Museum collection does contain an unidentified cuckoo's egg taken from a nest of *maculicollis*. It is white, with the normal tailor-bird markings imposed on it; its dimensions are 17.5×12 mm.

Ineubation.

Both birds ineubate, but the hen does much the greater part of the work. The cock bird only takes over for short spells at wide intervals. The eggs are often left unattended during the middle hours of the day, specially towards the end of the ineubation period.

Laying was recorded fairly closely for four clutches, each of 3 eggs. The demands of camp organization, and of the Japanese authorities, on an internee's time prevented the present writer visiting the nests regularly. As in the case of the data obtained for the Streaked Fantail-Warbler and the Yellow-breasted Sunbird (Gibson-Hill, 1950: 119 and 127) I am much indebted to the late Adrian Goodsea who made a number of the

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visits for me. Laying was spread over three days. In three nests the eggs were laid between 6 p.m. and 7.30 a.m. the following morning;¹² I have assumed that the hens followed the normal practice and laid the eggs about sunrise, that is between 6.45 and 7.15 a.m. In the fourth nest the eggs were laid between 7.30 a.m. and 11 a.m. on the first and third mornings, and before 7.30 a.m. on the second day. It is possible that this bird was visited a little earlier on the first and third days, and a little later on the second, and that it actually laid all three eggs about 7.30 a.m.

In all four cases incubation apparently began during the course of the day following the one on which the third egg was laid. It was not easy to be sure on this point as the birds generally slipped away unobtrusively when the nest was visited during the early stages of incubation. We observed this several times on occasions when both of us were free to inspect the nest together, one watching carefully from a distance while the other approached the nest from the opposite side. The chicks hatched during the course of the thirteenth day between 7.30 a.m. and 6 p.m., except in the case of one nest where the first chick was out of its egg when the nest was visited just after sunrise. The period between the time when the last egg was laid and the last chick hatched ranged from 11 days 22 hours \pm 2 hours to 12 days 9½ hours \pm 1½ hours approximately, assuming that the eggs that appeared during the night were actually laid about 7 a.m. Even this is rather longer than the periods recorded for the two other species, *C. j. malaya*, about 10½ days, and *L. j. microleuca*, about 11 days.

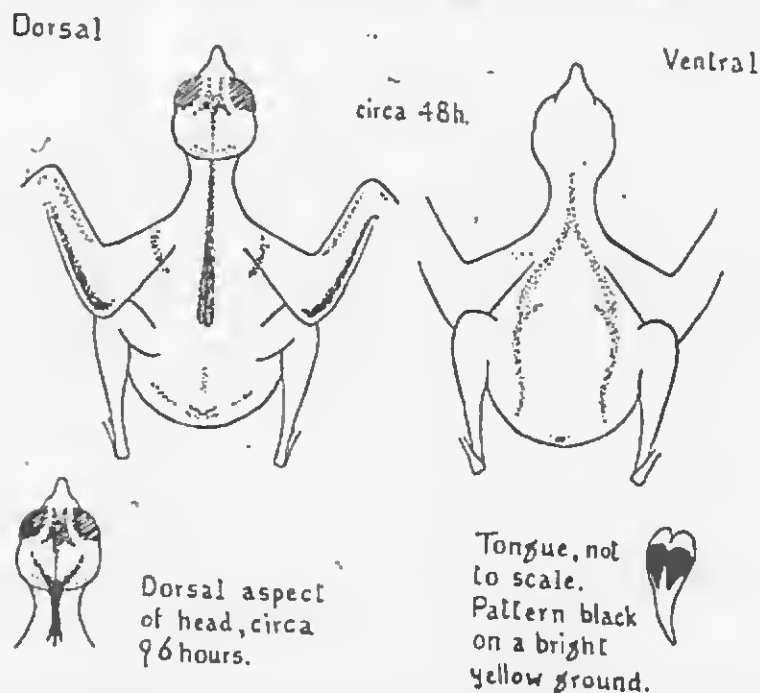
Fledging.

A newly hatched chick is completely naked. The general colour is reddish orange, with the remiges showing through the skin as a dark grey line; no other feather tracts are visible at this stage. The skin at the angle of the gape is a pale sulphur yellow. The inside of the mouth is bright yellow, and the tongue the same colour but with a broad black band, slit anteriorly in the midline, across it, as in *Cisticola*. The eyes are completely closed, but the slits are visible. The chick is very lethargic in its movements, but it offers its mouth for food freely whenever it is disturbed.

The chicks brighten considerably in the first twenty-four hours after hatching. They become much more active, and the co-ordination of their reactions improves markedly. By the time

12. "Tokyo Time". In relation to it the sun rose between 6.45 a.m. and 7.15 a.m., and set at approximately the same time in the evening. As far as possible the nests were inspected by Goodsea or the present writer at 7.30 and 11 a.m., and 3.30 and 6 p.m.; sometimes the visits were up to a quarter of an hour early or late.

that they are two days old they can recognise the call of the adults. When disturbed at this stage a chick makes a slight cheeping noise, and will not readily open its bill unless it receives the correct response. The major feather tracts (as shown in



Young chick of the Longtailed Tailor-Bird, *O. sutorius maculicollis* Moore, showing the feather tracts visible by the end of the second day.

the accompanying diagram) are now clearly visible under the skin, except for those in the region of the tail and on the ventral surface, which are still very faint. One can count about 63 feathers in sheath lying under the skin in the midline of the back, about 16 in each scapular patch and 3 or 4 round the vent. By the end of the fourth day the sheathed feathers have emerged about 1 mm. beyond the skin along the midline of the back as far forward as the nape, along the flank lines, in the scapular region, on the forehead and on the wings (primaries, secondaries and greater coverts). In addition the vertebral, flank, rump and tail patches are much thicker, and the line of future feathering on the back of the head is more clearly defined.

By the end of the sixth day feathers, still in their sheathes, are through the skin over nearly all the areas marked in the

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diagram. They appear to be dark grey in colour except for those on the lower, posterior part of the flank line, which are pinkish, and those on the upper part of the flank, which are a very light yellow. The longest remige, one of the inner secondaries, is now about 8.5 mm. in length, the longest wing covert about 5 mm., scapular about 4.5 mm., vertebral about 4 mm. and nuchal about 3 mm. The tail is about 5 mm. in length. The bill is light horn-coloured, with the skin at the gape markedly yellower than it was at hatching. A few feathers have also begun to appear on the femurs.

The eyes open slowly over the period between the fourth and ninth days. During this time the chicks become increasingly active and ultimately resist removal from the nest with considerable determination. By the time that the chick is eight days old the majority of the feathers have begun to emerge from their sheathes. Those along the flanks and in the midline of the back and the remiges are bare for the distal 1.5-3 mm.; the greater wing coverts, scapular, nuchal and tail feathers for 5-1.5 mm. The longest remiges at this stage are the inner primaries (16-17 mm.). The feathers on the back are about 8 mm. long, and some of those in the scapular regions about 7 mm. The feet are still a light flesh colour, but the yellow on the bill is growing stronger.

By the time that the chick is ten days old all the feathers are well beyond the ends of their sheathes except for those on the forehead, round the eyes and in the region of the ears. The breast and flank feathers are very fluffy, and those on the back are sufficiently developed to cover the dorsal surface of the chick so long as it lies still. The feathers on the forehead and crown are a dull, earthy brown, merging to olive green over the nape. The remaining upper parts, except for the greater wing coverts, are olive green. The rectrices, remiges and greater wing coverts are dark grey washed with a slightly yellowish olive green at the edges, the wash on the primaries being restricted to a thin line along the outer border, on the secondaries to a slightly broader edging and on the greater coverts to a still broader edging all round the vane of the feather. The feathers of the bastard wing are dark grey, with a trimming of pale sulphur yellow along the outer edge of the vane. There is also a thin line of white, from the under wing coverts, visible along the angle of the wing. The feathers of the under parts are white with grey bases; these are most marked on the side of the cheek. The feathers of the flank are lightly washed with ochreous buff, and those on the thighs with very pale fawn. The iris is dark brown; the bill is horn yellow at the tip changing to a full sulphur yellow at the angle of the gape; the legs and feet are pinkish.

The chicks become very active and restless during the next few days. By the time that they are twelve days old they are capable of fluttering for short distances, but they do not usually leave the nest on their own initiative until they are thirteen or fourteen days old. By the thirteenth day the sheaths have almost disappeared from the feathers of the back, scapular and breast regions. The coverts all lie flat except for those over the forehead, which still have relatively long sheaths and stick up like squat bristles. By the fifteenth day the feathering completely hides the skin when the bird is in a normal position. The rectrices, however, are still relatively short and they barely project beyond the tips of the coverts.

The hen spends the night on the nest with the chicks from the first day to the time when they abandon it. She usually arrives shortly before sundown, and remains there until about 7.30-7.45 a.m. Long before she leaves the cock has made his first strident tour of his territory. This late rising seems to be characteristic of birds that are spending the night with their chicks. In both *Cisticola* and *Leptocoma* I found that the dawn chorus was generally over before they moved away. Actually it is a sound enough procedure. The first hour of daylight can be very chill and damp, especially in low-lying country, and if the chicks are to be kept warm they still need protection over this period.

One set of three chicks was measured to within 27 hours of their leaving the nest; the figures (in mm.) for the eldest and youngest are given below. All measurements were taken about 9 a.m. The birds left their nest about noon on the fourteenth day, that is when they were about 13 days and 3-6 hours old. They moved, keeping fairly close together, to a bed of *Canna* some 40 feet from the nest. There they stayed until the following morning, when they were found by a group of small and fundamentally unpleasant boys. The latter killed the eldest chick, whose measurements are added below.

Age	Total length	Wing flat	Longest remige	Tail	Exposed Culmen	Bill to Gape
c. 2 hours	24	>4	..	..	3	4.5
{ c. 50 hours	34	6	..	..	5	6.5
{ c. 46 hours	31	5.5	..	..	4	5.5
c. 4 days	40	12	4	..	6	8
	43	11.5	3.5	..	6	7
c. 6 days	53	18	9	.5	7	9.5
	51	17.5	8.5	.5	6	8.5
c. 8 days	60	28	17	>3	7.5	11
	59	27	16	<3	6.5	10
c. 10 days	65	34	28	4	8	11.5
	63	32	24	4	7.3	10.5
c. 12 days	72	36	29	6.5	8	12
	73	35	27	5	8	11.5
c. 14 days	78	37	30	9	8	12

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Initially the longest remiges are the secondaries, and this remains so until the chick is about 11 days old. On the thirteenth day the longest feather was found to be the eighth primary; by the fifteenth day it is the fourth and fifth, as in an adult bird.

Feeding.

Both parents feed the chicks, but again the hen does much the greater part of the work. The food brought consists mostly of caterpillars and other insect larvae, with the occasional addition of small grasshoppers.

Feeding was observed at intervals throughout the fledging period at three nests, but unfortunately the visits could not be of set duration or regularly spaced. It did appear, however, that the rate of feeding did not alter appreciably while the chicks were in the nest, but that it was speeded up once they were away from it. The female bird worked steadily and quietly, arriving at the nest every 5-10 minutes for about 40 minutes, and then remaining away for 15-20 minutes, presumably while she took food for herself. She generally approached at a fairly low level, and kept under cover as much as possible. One nest, in an *Acrifolia* bush, was within about 3 feet of a long bed of Canna. The hen generally flew first to a particular plant, rather taller than the rest, about 25 feet from the nest. Then she made her way towards the nest by hopping and short flights among the Canna stems, emerging only when she was close to it. Sometimes she gave a short, faint cheep as she went up to the nest, but often she was completely silent until she reached it. She generally left by flying straight away from it towards another bed of flowers. The cock was very vocal, but far less helpful, making about one visit to every four by the hen. He used to appear first on the lowest branch of an Albizzia tree, about 50 feet from the nest. There he would call loudly for 30-90 seconds before making his way to the Canna bed. Arriving at the taller plant he would pause and call again, repeating the performance at intervals as he made his way leisurely towards the nest. When he reached it he always gave two or three short notes which were answered by the chicks. His departure was generally rather similar to his arrival, delayed and vociferous.

Summary

Notes are given on the breeding habits of the Malayan Longtailed Tailor-Bird, *Orthotomus sutorius maculicollis* Moore, based largely on data recorded on Singapore Island in 1944-45, and augmented in part by information obtained in the same region subsequently. Where possible comparisons are drawn with the material recorded by previous workers for the Malay States and Siam, and, where it seems to be of interest, for the Burmese and Indian races of *O. sutorius*. The normal breeding season in Singapore apparently runs from the end of December to August or September; this is longer than the periods recorded further north. The

average clutch size is smaller in the south, but the birds probably rear two or three broods in a season as against one or two further north. The hen initiates the building of the nest and does the greater part of the work at all subsequent stages. The cock devotes most of his energy to beating the bounds of the feeding territory. Incubation takes about 13 days; the chicks leave the nest when they are 13-14 days old.

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Appendix

There appears to be some doubt about the subspecific status of the Longtailed Tailor-Birds occurring in North Siam. Unfortunately there is only a limited amount of relevant material in the Raffles Museum collection. De Schaunsee (1928: 562, 1929: 554) and Deignan (1931: 148, 1936: 115) ascribe birds from Chiang Mai and Doi Suthep to the Burmese race, *O. s. patia* Hodgson. Riley (1938: 423) says that in his opinion "*O. s. patia* does not reach Siam at all, at least in its typical form, and all Siamese records had best be assigned to *maculicollis*"; the most northerly birds that he had examined are three males and a female from Ban Nam Khian, on the Menam Nun, collected 20-22 April. Deignan (1945: 488) ascribes all birds from Northern Siam to *O. s. inexpectus* La Touche.

The Raffles Museum has 6 specimens (♂ ♂) from the neighbourhood of Chiang Mai, 30 (♂ 19, ♀ 11) from Bangkok and 7 (Koh Lak ♂ 5; Mamoh ♂ 1, ♀ 1)¹³ from south-west Siam, in addition to its specimens

¹³ Koh Lak (approx. lat. 11° 48' N.) is situated on the west side of the Gulf of Siam, just south of the town of Prachuab Kirikhan. Mamoh (approx. lat. 10° 13' N.) is a Siamese village at the north end of the Pakchan estuary, about 18 miles north of Victoria Point. The only bird in the Raffles Museum collection from Siamese territory south of the Isthmus of Kra is a female taken at Trang (approx. lat. 7° 35' N.), on the west side of the peninsula, on 1 December. It cannot be distinguished from average skins from the Malay States.

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from the Malay Peninsula. According to Stuart Baker (1924: 413) *inexpectus* cannot be separated from another South China race, *O. s. longicaudus* (Gmelin), which is said to be the darkest of all the forms of *satorius*, with the underside strongly suffused with buff and the anterior crown deep rufous with a very dark nape. The Malayan race, *maculicollis*, differs from the others in having the ear-coverts and sides of the neck white mottled or streaked with blackish (instead of pale rufescent-white); the other characters given by Stuart Baker, the throat and upper breast invariably marked with black, owing to the black bases to the feathers showing through, and the underparts otherwise silky-white, only very slightly suffused with buff (instead of tinged with buff as in *putia*), are not satisfactory. The type locality of *maculicollis* is "Malacca" and birds from the southern Malay States show considerable individual variation in both these characters.

I cannot detect any constant significant difference in colour between birds from the southern portion of the Malay Peninsula and the Siamese specimens summarised above. The Mamoh and Koh Lak birds as a series have the buffy wash on the under-parts rather deeper than the majority of the Bangkok and Malayan birds, but there are some in both series that match them closely. On the other hand there is a difference in the males in the degree of elongation of the centre tail feathers. According to Stuart Baker (*loc. cit.*) this occurs only in the summer months in Indian and Burmese birds, and is longest in specimens of typical *satorius* from north-western India. His figures suggest that in summer the centre feathers may exceed the remainder by as much as 70-80 mm. (max. gross length 112 mm.) in Indian birds; about 30 mm. (max. gross 66 mm.) in *putia*; 25 mm. (max. gross 60 mm.) in *longicaudus*; and 20 mm. (max. gross 56 mm.) in *maculicollis*. In the following measurements the figures in brackets give the gross length, measured from its base, of the longer of the two centre tail feathers. In 3 of our males from Chiang Mai the longer centre feather exceeds the longer feather of the adjacent pair by 12 (52), 22 (66) and 25 (62) mm. respectively. In 6 Bangkok males in full plumage taken between 7 June and 18 August the excess is 7 (44), 7 (46), 11 (54), 12 (58), 19 (61) and 24 (72) mm.; average 15 mm. The 5 males taken at Koh Lak (3-10 April) have the centre feathers elongated 15 (52), 21 (55), 21 (65), 24 (65) and 24 (69) mm.; average 21 mm. In 5 males from Johore and Singapore Island taken between 5 June and 12 September the elongation is 9 (54), 11 (52), 12 (50), 12 (54) and 20 (61) mm.; average 12.8 mm. It would seem from the points covered here that the Bangkok birds must certainly be accepted as *maculicollis*. Stuart Baker's figures presumably give approximate maxima, and the average excess elongation for fully feathered *putia* is probably about 25 mm., and for *longicaudus* about 20 mm. This brings the specimens from Koh Lak and Chiang Mai very near to them in this character. Nevertheless for the present it is probably advisable to follow Riley and regard all Siamese birds as con-specific with the peninsular ones. Deignan's field notes from Northern Siam have accordingly been considered in preparing this paper.

No. 12. Nesting notes on the Spotted Munia, *Munia punctulata fretensis* Kloss.

The Spotted Munia¹⁴ is strictly resident in Malaya. In spite of the very brief notice given to it by Chasen (1939: 374) it is common in rice fields, lightly wooded grass country and *bēlukar*, principally in the vicinity of villages and settlements, over the greater part of the lowlands of the Malay States. It also occurs on the islands of Penang, where according to Cairns (*in litt.*) it is less common than the other Munias, and Singapore, where it is very plentiful in suitable areas. Here it also frequents large and medium-sized gardens; and where food and nesting sites are available it comes well into the town itself. I have seen pairs building on the edge of the East India Company cemetery on the side of Fort Canning Hill, behind the Raffles Museum building, on the Newton Circus slope of Mount Sophia and in the Botanic Gardens. During 1948 and 1949 several pairs were feeding in my garden in Tanglin and nesting in a line of tall Pinang Palms, *Areca catechu* Linn., in the neighbouring garden.

Much of the original data recorded here was obtained in the Sime Road Internment Camp in 1944-45; the greater part of the remainder has been gathered subsequently in the Tanglin district of Singapore town. Unfortunately the difficulty of examining nests *in situ* restricts the range of information that can be obtained under natural conditions, and it will be found that these notes are less full than those given for the other three species (Notes 6, 7 and 11).

General Habits.

In Malaya the Spotted Munia is apparently restricted to the lowlands and larger off-lying islands. The only Munia at present known to spread up into high hill country in our area is the Sharptailed Munia, *M. striata subsquamicollis* (Baker), which has been reported breeding at Fraser's Hill, alt. about 4,000 feet (Madoc, 1947: 104), and Cameron's Highlands, alt. about 5,000 feet (Berwick, 1947: 39). At the same time a careful watch should be kept for the Spotted Munia in these areas. Jacobson found it fairly plentiful at Fort de Kock, Padang Highlands, West Sumatra, alt. about 2,800 feet (Robinson and Kloss, 1924: 328), and Robinson and Kloss (1918: 260) report breeding at Siolak Daras, alt. 3,000 feet. Stuart Baker (1926: 91) says that the nominate race "breeds up to some 5,000 or 6,000 feet throughout India in the better-wooded country, where there is a plentiful and regular rainfall". The Burmese race.

¹⁴. Malayan Checklist No. 568. No secondary sexual differences in the colouring of the plumage or soft parts.

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M. punctulata subundulata Godwin-Austen, seemingly also nests in high hill country as well as in the lowlands. No one can accuse the central mountains of Malaya of lacking a plentiful and regular rainfall.

The Spotted Munia, like the other species, feeds on low-seeding herbage, restricting its attentions almost entirely to *Oryza* and other coarser grasses. It frequently obtains the seeds by perching high on a nearby stem, enclosing the top of the seeding head in its half-open bill and then sliding down, shearing the seeds off with the edge of its mandible as it does so. It scarcely if ever takes food from the ground under natural conditions, though it will feed freely from grain in this way in captivity. All the stomachs that I have examined on Singapore Island contain only grass seeds.

In Malaya the Spotted Munia generally frequents rather less open grassland than the Blackheaded (*M. atricapilla sinensis* Blyth) and White-headed (*M. m. maja* (Linné)) Munias. When in rice country it usually keeps fairly close to the little clumps of palms and houses that dot the fields. It is in general largely confined to the neighbourhood of human habitations. In this it differs from the Sharptailed Munia which may be met with also in grassland interspersed with patches of secondary jungle and even on paths and clearings in light jungle. It is scarcely likely that the limitation of the range of the Spotted Munia is due to its diet. All four birds take rice seeds freely (when they are allowed to do so), and the coarser grasses are much the same in all the habitats mentioned. Possibly it is the presence of the Pinang or Betel-Nut Palm, *Areca catechu* Linn., that attracts it to the vicinity of human settlements. It is known to nest in a fairly wide range of palms and trees, but there would seem to be no doubt that where possible it makes use of the Pinang Palm. This point is even noted in its Malay names, *Pipit Pinang* in the Peninsula, and, according to Jacobson (in Robinson and Kloss, 1924: 345), *Pipi Pinang*, *Tjidi Pinang* or *Bondo Pinang* in West Sumatra.

Voice.

Young birds in the nest often keep up an almost incessant cheeping. Presumably they are especially noisy when they are hungry or bickering among themselves. Adults are fairly silent except when they are feeding. They normally feed in small parties, or if they are numerous in an area in flocks of 50-100 or more. Members of these groups call to each at intervals, a short, rather sharp, metallic *peek, peek, peek*, as they move about. If the party is disturbed the birds all rise together, each complaining petulently and the whole having the effect of the tinkling of tiny bells.

Breeding Season.

On Singapore Island the breeding season is extended, but I doubt if this species normally breeds all the year round, as the Tree-Sparrow, *Passer montanus malaccensis* Dubois, does. I have records of building spread fairly equally over the months from January to September, and one bird seen carrying material early in October. Nests with eggs or part-fledged chicks were collected in February (3), March (2), April (1), May (2), June (2), July (3), August (3) and September (1). Family parties were seen in the Sine Road area from March to October, and once in November. From observations made from a distance on the birds breeding in the heads of a row of Pinang Palms in the Tanglin area I am sure that the birds normally rear three broods in a season, building about January, April and July. One unit apparently got in four broods, building in January, late March, June and August. Spittle (1950: 203), summarising data collected on the Changi Promontory at the east end of the island, says that he observed nest building from January to May and July to September, and found occupied nests from March to May and in July. He puts the full season at January to October, and suggests that in that period two, or perhaps more, broods are reared. I am not satisfied that there is a real break in reproductive activity in the middle of the season, as his data suggests, but I would agree that there is little or no nest-building in the last three months of the year. This means that on Singapore Island the birds avoid the period of heaviest rain, starting their breeding at the close of the major rainy season and running on until the wetter weather sets in again.

Further north the breeding season is seemingly shorter. Edgar (1933: 156) says that he found nests in the Sitiawan district of southern Perak from February to May. February is normally a very dry month in this region, and the wettest periods are round April and October. There apparently the bird breeds through one season of rainy weather, but avoids the other. Madoc (1947: 105) does not give any breeding dates. Two clutches in the Raffles Museum taken by V. W. Ryves were collected on 6 February (Selangor) and 27 February (Negri Sembilan).

Herbert (1923: 122) says that at Bansakai, near Bangkok, Central Siam, the Spotted Munia breeds throughout the rainy season, that is from May to August. According to Deignan (1945: 558) the race occurring round Chiang Mai in northern Siam (*?topela* Swinhoe) breeds mostly during July and August, during the heaviest rains; the earliest date at which he found gonads active was 8 May. Smythies (1940: 190) says that in Burma "the breeding season is during the rains, and even as late as December". According to Stuart Baker (*loc. cit.*) in

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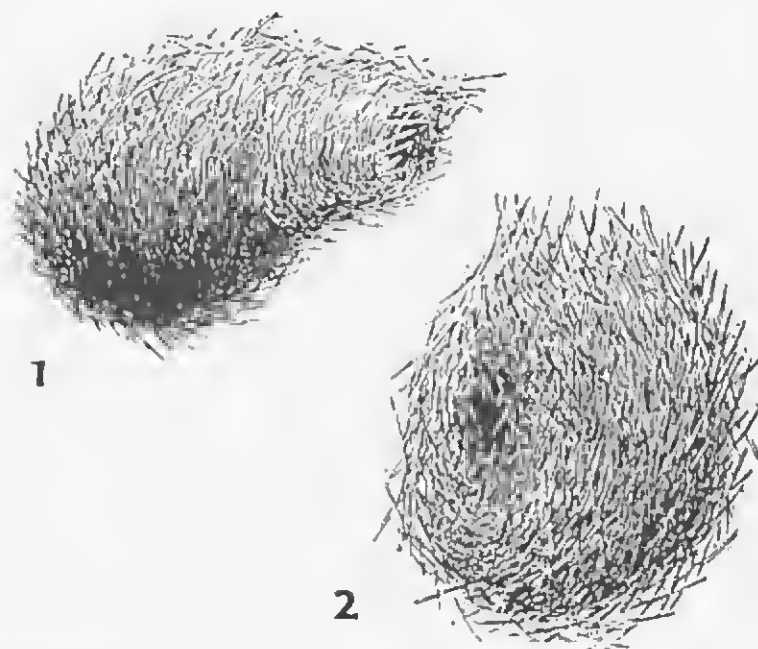
India the nominate race breeds more or less throughout the year, but more freely after the rains break. Whistler (1928: 161) on the other hand says that the breeding season is usually during the rains in July and August, but in the Nilgiris it is more extended and runs from February to September. The latter, of course, gives a season roughly comparable to the one maintained on Singapore Island. Apart from this, and Stuart Baker's version of the Indian breeding season, it would seem that the Spotted Munia, like several other species, breeds over a progressively shorter season as one moves northwards from Singapore. Again it appears that in the latter region it avoids the three wettest months, though further north, in central and northern Siam and possibly Burma and India, breeding is concentrated in the period of heavy rains.

Nest.

The nest is normally placed rather higher than those of the other local Munias. In my experience it is generally in the head of a Pinang Palm, or rarely a Coconut Palm, at a height of 25-30 feet from the ground, or in a Rambutan, Rubber or Wild Cinnamon Tree at a height of 20-30 feet. In the case of the Rambutan and Rubber Trees it is usually situated in a fairly exposed position, towards the end of a lateral branch 10-15 feet from the trunk. In the Wild Cinnamon, *Cinnamomum iners* Blume, it is of necessity in a vertical fork, against the main stem. Of 46 nests located, 24 were in the heads of palms, 17 in other trees at heights between 20-30 feet, 2 in Cinnamon bushes at heights between 15 and 20 feet, and 3 in other bushes at heights between 10 and 15 feet. I have not yet found a nest of this species below about 12 feet from the ground.

Spittle (*loc. cit.*) records building down to about 5 feet. He says that the nests are mostly placed in rather exposed positions, in bushes or trees, at a height of 5-30 feet above the ground; Chēmpēdak (*Artocarpus champeden* Spreng), Coconut, Halban (*Vitex pubescens* Vahl.), Mango, Mēmpoyan (*Rhodamnia trinervia* Blume), Mēndarong (*Tremia orientalis* Blume), Pinang, Pulai (*Alstonia angustiloba* Miq.), Rambutan and Rubber were all used. Edgar (*loc. cit.*) writing of the Sitiawan district of southern Perak, says that all the nests that he found were in Pinang Palms or Sealing-Wax Palms, *Cyrtostachys lakka* Beccari, at heights of 12-18 feet. Madoc (1947: 105) describes the nests as "usually built quite high up in the crowns of areca and other palms". Herbert (*loc. cit.*) referring to the northern race *M. p. subundulata*, says that in the fruit gardens at Ban-sakai, near Bangkok, the favourite site for a nest is in the heads of the Pinang Palms 20-30 feet from the ground. Deignan (*loc. cit.*), on the other hand, brings the height down again, giving the usual site round Chiang Mai as 5-20 feet from the

ground in shrubs, vines and trees "and so insecurely attached that any good blow may bring it crashing down". The last point is certainly widespread. Many Malayan nests are equally insecure and they sometimes fall before the chicks have left them. Whistler (*loc. cit.*) says that in his experience in India the nests are usually wedged into the fork of a tree or bush at heights of 5-7 feet, and occasionally higher. It is, of course, possible that some of these observers have noted occasional low nests and not detected the full proportion of high ones, but it is more likely that the Malayau birds differ from the others in preferring a greater degree of elevation. The Sealing-Wax Palm, which has a head somewhat similar to that of the Pinang Palm, only reaches a height of about 15 feet, but it grows in rather damper localities than *Areca*. Presumably it offers the birds the possibility of a palm-head site in areas where there are few or no Pinang Palms. Apart from this it must, I think, be taken that nests below 15 feet from the ground are exceptional in the Malay Peninsula.



Nests of the Spotted Munia, *M. punctulata fretensis* Kloss. 1, a normal flask-shaped nest, as in nos. *a*, *c*, *f* and *i* (pp. 104-7). 2, a somewhat more globular nest, as in *h* (see p. 107).

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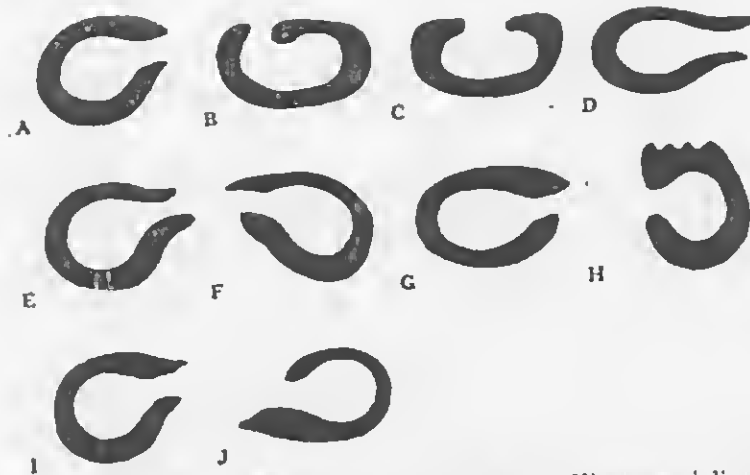
The nest is roughly similar to that of the other local Munias, though they all probably show slight specific differences. It is a bulky rather untidy structure built of the flowering heads and leaf blades of lalang and finer grasses. It is generally about 160-190 mm. long, and 100-130 mm. in diameter. The shape varies, but it is usually ovoid or flask-shaped, with the entrance at one end. The floor and roof, when it is present, are mostly 20-35 mm. thick; the sides slightly but not much thinner. In flask-shaped nests the entrance is at the narrower end, and the upper lip may be carried forward a little to provide a short cave. Usually the nests are lined with slightly finer material than that used for the core. One generally finds also that the flower-heads in this zone have lost their seeds. An examination of three unfinished or unused nests suggests that they are stripped after the nest has been completed; presumably the incubating bird picks at the seeds. The floor of the nest is invariably fouled with droppings. This is not, apparently, entirely the fault of ineonitent chicks as I have found excretory material in unfinished nests, and definitely below the lining in several nests which had never held chicks. Presumably the adults begin the process when they are using the nest during its construction.

It seems probably that in some cases two hens share the same nest—and male bird. Even apart from these instances two birds are usually seen working on the nest, and it must be that the cock takes a full share in its construction. The grass heads and leaves are always taken from near the nest site, and the material used varies slightly according to the predominant species in the neighbourhood, but the birds do not usually work from grass growing immediately under it. They generally take the heads from patches 50-150 yards away. One pair that I watched regularly crossed a shallow valley, a distance of about 200 yards, to gather material, although the tree in which they were nesting was itself growing on a grass-covered bank. A large number of the stems used are about twice as long as the birds. It seems probable that when laden they find it easier to fly on a gradually inclined course rather than to rise steeply. When they are building the Munias work quickly, descending for fresh pieces of material about once every 40-50 seconds for 15-20 minutes, and then resting for a short spell. They usually fly straight down to the clump, nip the flowering head off a grass with scarcely a pause and then fly straight back to the nest with it. The construction of the nest seems to take about 12-15 days.

Mos. 23, 1950. ▲

[103]

The following provides a more detailed analysis of 10 nests from the Sime Road area. The accounts have been selected from dissections of 15 nests to show the range of shapes and the variations in the disposition of the material employed.¹⁵



The Spotted Munia, *Munia punctulata fretensis* Kloss: semi-diagrammatic longitudinal sections of the ten nests described on pages 104-7.

(a) A flask-shaped nest from the crown of a coconut palm, height about 40 feet, growing in grass-covered ground; collected 4 July, 1944. It contained four fledglings, about 95 mm. long. Maximum length externally about 180 mm., diameter about 120 mm. The entrance, which was tightly constructed, neat and firm, had a diameter of about 30 mm. The inner cavity was about 140 mm. long with a maximum diameter of 80 mm. The outer layer of the nest was composed of lalang blades and, especially round the entrance, flowering heads loosely woven together; in the whole nest there were about 178 heads, mostly varying in length from 160-220 mm., but with some running up to 405 mm. The core of the nest was composed of leaf blades of lalang and other grasses, together with a few heads of lalang, *Panicum ?chinensis* and *Ischaemum timorense*; in all the nest contained about 208 grass blades, mostly 120-240 mm. long, but with a small number of longer blades 300-360 mm. long. The inside of the nest was lined with seeding heads of various grasses, mostly *P. ?chinensis*, but including also *I. timorense*, *Paspalum conjugatum*, *Eragrostis unioloides* and lalang; these were

15. I am much indebted to Mr. J. N. Milsum, O.B.E., now Director of Agriculture, Seychelles, for providing me with the identifications of nesting material used in this section of the paper. The grasses that were being employed for building in the Sime Road area were:—

Eragrostis elegantula Steud.
Eragrostis unioloides Nees (Rumput Kolam Padang).
Imperata cylindrica Beauv. (Lalang).
Ischaemum timorense Kunth. (Rumput Sarang Buaya).
Panicum ?chinensis and a second *Panicum* sp.
Paspalum conjugatum Berg. (Buffalo Grass).
Sacciolepis turgida Ridley (Rumput Bldis).

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very neatly and compactly worked together, giving the wall of the chamber and the entrance a firm, finished surface; there were in all about 197 grass heads, excluding lalang, mostly 120-180 mm. long, but with some running up to 300 mm. The floor of the nest was very foul.

(b) A second nest from the crown of the same coconut palm. It contained five fledglings about 79 mm. long and two fresh eggs. It was roughly rectangular in shape, with the edges well rounded and the aperture at one end of the upper surface. Externally it had a maximum length of about 175 mm., width of 100 mm. and height of 85 mm. The chamber had a maximum length, including the entrance tunnel, of about 105 mm., width of 80 mm. and height of 65 mm. The entrance tunnel was about 25 mm. long, with a slightly ovoid cross-section, 35 X 40 mm. The core of the nest was formed of narrow grass blades with a few lalang heads and fragments of lalang leaf blades mixed in with them. The outside was loosely and untidily woven of grass blades and lalang heads. The cavity was neatly lined, mostly with seed heads of *Panicum ?chinensis* and a second *Panicum* sp., together with a few lalang heads. The total number of lalang heads in the whole nest was about 153, mostly 120-200 mm. long, with some up to 270 mm.; of *Panicum* heads (of which about 75% were *?chinensis*) about 158, mostly 140-200 mm. long; of grass blades 341 (of which 15 were lalang), mostly 150-360 mm. long, with some running up to 450-550 mm. In addition there were 16 creeping stems from grasses, mostly 140-200 mm. long, included in the body of the nest. The floor of the chamber was very foul.

(c) A boat-shaped nest, with the entrance in the middle of the upper surface, from the crown of a coconut palm; collected 23 July, 1944. The nest was freshly built but clean and empty; presumably the bird had not laid in it. Externally it had a maximum length of 165 mm., width 120 mm. and depth 90 mm. The entrance aperture was about 70 mm. by 55 mm. The chamber was approximately 100 X 85 mm., with a maximum depth of 70 mm. The outside was loosely and untidily woven of lalang heads together with a few grass blades, the core was of grass blades and lalang heads and the lining and rim of stripped seed-heads of *Panicum ?chinensis*. On dissection it was found to contain 153 lalang heads, mostly 170-250 mm. long, 138 grass leaf-blades, mostly 190-280 mm. long, 316 flower-heads of *P. ?chinensis*, mostly 160-210 mm. long, 1 stem of an *Ischaemum* sp. 120 mm. and 1 head of *Eragrostis unioloides* 105 mm. long. The lining of the floor of the cavity was clean, but there was some slight fouling beneath it.

(d) A typical flasked-shaped nest from the side branch of a Rambutan tree, about 25 feet from the ground and 10 feet out from the main trunk; collected 5 July, 1944. It contained three fledglings about 82 mm. long. The nest was tightly wedged in among the lesser branches and some of the latter were included in the outer layer. Externally it was about 200 mm. long, with a maximum diameter of 120 mm. The cavity was about 150 mm. long, with a diameter of 55 mm. The entrance had a diameter of about 35 mm. The nest was constructed almost entirely of flowering heads of lalang, *Imperata cylindrica*, loosely woven together, except for the lining which was composed of *Panicum ?chinensis*. On the outside of the nest, and round the entrance, the lalang heads had lost most of their down, but it was still present on those forming the core of the structure. There was a total of about 510 heads, mostly 160-220 mm. long, with some up to 310-320 mm.; 6 lalang leaf-blades were included in the core. The inside of the nest was

lined with 97 fine grass stems and heads of *Panicum*, mostly 140-200 mm. long, but with some pieces much shorter. The floor of the nest was very foul.

(e) A rather squat flask-shaped nest from the crown of a Wild Cinnamon tree, *Cinnamomum iners* Blume, about 25 feet from the ground; collected 18 August, 1944, after a family of five fledglings had left it. It differed from the majority of the nests of this shape in having the lower lip of the entrance projecting further than the upper. Externally it was 155 mm. long with a maximum width of 95 mm. and a height of 110 mm. The entrance aperture was 30 × 40 mm. The maximum section of the chamber was approximately 65 × 80 mm., with its greatest length, including the entrance tunnel, 125 mm. The outside of the nest was constructed of lalang heads and grass blades, loosely and untidily woven together, the core mostly of grass blades, and the lining of lalang heads and the plucked heads of various other grasses, mostly *P. ?chinensis*. An analysis of the lining showed 96 lalang heads, mostly 250-300 mm. long, 368 heads of other grasses, mostly 150-250 mm. long, of which nearly 95% were *P. ?chinensis* and the remainder *Sacciolepis turgida* and a *Panicum* sp., together with 18 heads of Buffalo Grass, *Paspalum conjugatum*, broken off about 15 mm. below the bifurcation. The floor of the chamber was very foul.

(f) A flask-shaped nest from a forked branch on a rubber tree, about 20 feet from the ground and 12 feet from the main trunk; the tree was growing near rather marshy ground; collected 19 August, 1944. The nest contained three fledglings about 70 mm. long. The upper lip and one side of the entrance projected forward slightly. Externally the nest was about 160 mm. long (measured from the shorter side of the entrance), 150 mm. high and 100 mm. wide. The chamber, including the entrance tunnel, was about 130 mm. long. The entrance, which was nearly circular, had a diameter of about 35 mm. The outer surface of the nest was composed of grass blades and flowering heads of lalang, loosely and untidily woven together, except round the entrance where most of the material was plucked flowering heads of *P. ?chinensis* and *I. timorensis*. The core of the nest was composed largely of grass blades and lalang heads, together with a few heads of various species of *Panicum* and *Eragrostis* and 22 creeping stems of various grasses, mostly 100-180 mm. long, but with 5 over 340 mm. and the longest running to 643 mm. The lining of the chamber and entrance was composed almost entirely of grass heads, together with 24 grass blades and 26 heads of lalang; the grasses represented were *P. ?chinensis*, mostly 140-190 mm. long, 236 pieces; *I. timorensis*, mostly 200-300 mm. long, 65 pieces mostly round the entrance; a *Panicum* sp., mostly 200-280 mm. long, 56 pieces; *Eragrostis elegantula*, mostly 130-180 mm. long, 69 pieces; and *E. unioloides* 1 piece. The total counts for the various grasses in the nest as a whole were *P. ?chinensis* 274 pieces, *I. timorensis* 73, *Panicum* sp. 76, *E. elegantula* 113, *E. unioloides* 1, making a grand total of 537 pieces; lalang heads, mostly 150-250 mm. long but with some up to 376 mm., 204 pieces; grass leaf blades, 180-250 mm. long with some up to 418 mm., 224 pieces; and creeping stems 22 pieces. *Eragrostis elegantula* which was not recorded for the earlier nests, grows in dampish situations. The floor of the chamber was very foul.

(g) A flask-shaped nest from a Rambutan Tree, about 20 feet from the ground and 15 feet from the main trunk; collected 25 August, 1944, after a family of four fledglings had left it. It was a fairly bulky, thick-set structure, with the bulge to one side and not below it as in most flask-shaped nests. Externally it was about

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170 mm. long, 130 mm. wide and 95 mm. high. The aperture was about 35×40 mm., with the upper lip projecting 15 mm. beyond the lower. The outside of the nest was untidily woven of lalang heads and a few leaf blades, with the aperture lined with lalang heads. The core was composed of leaf blades and heads of lalang and other grasses, mostly *P. ?chinensis*, largely still slightly green and with the seeds attached. The lining was of grass heads, over 95% *P. ?chinensis*, with a few *Panicum* sp. and *E. unioloides*. The interior was very foul.

(h) An abandoned nest from between two branches, about 25 feet from the ground, in a Rambutan Tree overlooking a vegetable garden and a lalang covered bank; collected 30 September, 1944. It was a simple flask-shaped structure but with the roof carried vertically upwards to form a longitudinal crest. Externally it was about 140 mm. long, 75 mm. wide and with a maximum height of 180 mm. The length of the chamber and entrance together was about 100 mm. The aperture was circular, with a diameter of about 35 mm. The nest was composed largely of 578 flowering heads of lalang, mostly 200-300 mm. long. With them were 109 grass leaf blades worked into the core of the nest. The other material consisted only of 3 creeping stems, 430, 390 and 210 mm. long, 9 heads of *P. ?chinensis* and 2 heads of *E. elegantula*.

(i) A flask-shaped nest collected from a fork on a side branch of a rubber tree, 30 feet from the ground and 10 feet out from the main trunk; collected 17 March, 1945, after a family of three fledglings had left it. Externally it was about 170 mm. long, with a maximum height of 130 mm. and width of 100 mm. The circular entrance aperture had a diameter of about 30 mm. The chamber was 75 mm. high, 70 mm. wide and with a length, including the entrance tunnel, of 140 mm. The outside of the nest was untidily constructed of lalang leaf blades and flowering heads, the latter with much of the down worn away. The core was of grass blades with a few lalang heads. The lining of the chamber and aperture was composed largely of lalang heads with about 25% of heads of other grasses, mostly *Ischamum timorensis* with a few *P. ?chinensis*; the great majority of these heads had lost their seeds. The floor of the nest was very foul.

(j) An unfinished nest from the same tree as (i) above, situated about 30 feet from the ground and 10 feet from the main trunk. The shape of this nest as it stood was peculiar in that the lower surface was flat and the under lip of the entrance projected much further than the upper, but this latter point might have been corrected when the lining was added to the tunnel. Externally the maximum length was 195 mm., height 145 mm. and width 140 mm. The unlined aperture was circular, with a diameter of 40 mm. The chamber had a maximum diameter of about 85 mm., and a length of about 100 mm. The outside of the nest was composed mostly of lalang heads, 240-300 mm. long, with the full down still adhering to them, and a few greenish leaf blades. The core was composed mostly of grass blades with a few lalang heads and heads of *I. timorensis*. Work had been begun on the lining, but there were only about 50 pieces to it, all heads of *I. timorensis*, mostly 180-250 mm. long, the majority with their full complement of seeds. There were some droppings in the core, below the surface layer, from which it would appear that the parent birds foul the nest as they build it and that the deep foulness found in old nests is not entirely due to penetration from the floor of the chamber. There were also a few feathers pressed loosely into the inner surface of the core.

Eggs.

Only three apparently complete clutches were examined personally; they contained 3, 4 and 4 eggs respectively. Spittle (*loc. cit.*) merely says that the normal clutch is 4. Edgar (*loc. cit.*), writing of the Sitiawan district of Perak, gives the usual clutch as 4 or 5; four sets from the Malay States in the Raffles Museum contained 4 (Madoc, Klang), 2 (Ryves, Selangor), 2 (Ryves, Selangor) and 5 (coll. and state not known) eggs. My records of nests examined containing fledglings show 5 families of 3, 4 of 4 and 4 of 5. It seems probable that on Singapore Island and in the Malay States the clutch normally ranges from 3 to 5, with 4 the optimum number. The nest of this bird found at Siolak Daras, in the Korinchi district of Sumatra, contained 4 eggs (Robinson and Kloss, 1918: 260).

Seemingly clutches are rather larger in the northern races of the Spotted Munia. Herbert (*loc. cit.*) does not give figures, but suggests from his reference to the other local Munias that he regarded 5 to 6 eggs as the normal for *subundulata* in the neighbourhood of Bangkok. Deignan (*loc. cit.*) merely refers to a nest containing 5 youngsters in his compound on the outskirts of Chiang Mai. Whistler (*loc. cit.*), writing of the nominate race in India, says the clutch varies from 4 to 10 eggs. Stuart Baker (1926: 90-93) gives no clutch sizes.

In giving my own records above I have omitted two sets of figures. One is a nest taken on 4 July, 1944, which contained 5 fledglings about 80 mm. long and 2 fresh eggs (nest *b* above); the other taken on 14 April, 1945, contained 4 fledglings about 84 mm. long and 3 apparently fresh eggs. In addition on 17 February, 1949, I was shown a nest that had blown down from the head of a Pinang Palm which contained 4 newly hatched chicks, still naked, and 3 part-fledged youngsters about 72-76 mm. long. I am also of the opinion that in one case I have watched three, not two, birds building a single nest. There seems, in fact, to be little doubt that occasionally one male bird has two hens laying for him in the same nest. This would also account for the family parties which sometimes appear to have three adults in attendance, and Deignan's observation that when a nest blew down from the coconut palm in his compound the four surviving chicks "were seen next morning fluttering about on the ground and attended by *three* adults" (*his italics*). This behaviour has not been recorded previously for the Spotted Munia, but Stuart Baker (1926: 89) writing of the Indian Whitethroated Munia, *Munia malabarica* (Linn.), says that "the eggs number four to eight but sometimes two hens lay in one nest and fifteen eggs have thus been found".

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The eggs of the Spotted Munia are egg-shaped, with a fine matt surface coloured a uniform white. 13 eggs from Singapore Island averaged 15.4×11.5 mm.; 10 eggs in the Raffles Museum from the Malay States average 15.5×11.6 mm.; the extremes of the two sets taken together are, maxima 16.5×12 , minima 14.5×11 and 15.5×10.5 mm. The four eggs from Siolak Daras average 15.75×11.13 mm. Edgar says that in the Sitiawan district eggs measure about $.61 \times .43$ inches ($= 15.5 \times 10.9$ mm., approximately).

Smythies says that in Burma eggs average $.65 \times .46$ inches ($= 16.5 \times 11.7$ mm.). Herbert gives a slightly larger size for his eggs of *subundulata* 16.6×11.8 mm., but he also does not disclose the length of his series. Stuart Baker gives 16.1×11.1 as the average of 30 eggs of *subundulata* and 16.4×11.6 as the average size of 100 eggs of the nominate race; his maxima are 17.0×12.0 mm. and 18.0×12.0 mm. respectively. On the evidence available the northern eggs appear to be slightly longer than those of *fretensis*.

Fledging.

No attempt was made to time the incubation or fledging periods, as I was not able to find a nest which could be examined closely *in situ*. The smallest chick for which I have detailed notes was 79 mm. long; with the wing measured flat 38 mm. (inner 3 primaries and outer secondary 26–27 mm., sheathes 8–9 mm.), tail 12 mm. (sheathes 7–8 mm.), exposed culmen 7 mm. and bill to the gape 7.5 mm. The irides were dark brown; the eyelids almost black; the bill black with the angle of the gape and the edge of the lower mandible white; and the legs and feet grey with the pads a light sulphur yellow. The palate was sulphur yellow marked with black; the forward angle was black, there was a black transverse line behind it curving back along the sides of the palate to finish as a median border to the white line



The Spotted Munia, *M. punctulata fretensis* Kloss. (a) pattern of the bill and gape in a young chick. (b) pattern of the palate seen from below.

on the angle of the gape, and a black T-shaped pattern on the centre of the palate. The remainder of the inside of the mouth was a pale watery pink except for a black transverse bar below the tongue and a three-quarter ring of black on the tongue itself.

The dorsal surface of the head was completely covered with feathers (which thus develop earlier in this region here than they do in many Passerine birds), with the shafts about 2 mm. in sheath. The feathers were shorter towards the bill and over the eyes, and some in these areas were still completely ensheathed. The feathers on the side of the face were mostly completely in their sheathes and only 1-2 mm. long. The feathers on the chin and throat were still erupting. The dorsal and two flank lines were well developed, with the feathers 5-7 mm. long (sheathes 2-3 mm.). The longest feathers in the scapular region were about 11 mm., with 4 mm. sheathes. There was irregular and diffuse feathering on the thighs and round the cloaca, 1-2 mm. long. The axillaries were 2-3 mm. long, the upper and under tail coverts 5-6 mm. (sheathes about 3 mm.). The upper wing coverts were well developed, with the longest feathers 6-11 mm. (sheathes 2-4 mm.), and the under wing coverts 5-6 mm. (sheathes 3-4 mm.).

A chick 82 mm. long from another nest was a little more advanced. The longest remiges were the fifth and sixth primaries which were 33 mm. long. The wing flat measured 41 mm., the exposed culmen 8 mm. and the bill to gape 9 mm. Feathering appeared to be fairly complete, though there was still a thinish patch over the forehead, where most of the feathers were still enclosed in their sheathes, and the feathers did not fluff over sufficiently to cover the middle of the breast and belly or the rump. A chick still older, with a length of 95 mm.—wing flat 47 mm., (longest primary the fourth, 34 mm.), tail 24 mm.—managed to fly for a short distance when liberated from the fallen nest. It covered about 40 feet and made a safe landing on a low branch of a rubber tree, where it sat ccheeping until it had attracted the attention of a passing adult. Feathering was apparently complete in this chick except that the submentals were still enclosed in their sheathes, and the posterior ear coverts were still largely so. The rump and midline of the belly were, however, adequately covered when the chick was in a normal position.

At least the adults, and probably the youngsters also, sometimes continue to roost in the nest at intervals after the latter have left it to feed on their own. In some cases at least it would seem that old nests may be used in this way, if they do not fall down, until the season comes round for a fresh one to be built. This is seemingly contingent on there being a sufficient amount of food available in the immediate vicinity. If

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there is not, then the adults move away about September or October and flock in areas richer in seeding heads until the beginning of the next year. In both 1948 and 1949 the adults inhabiting the neighbourhood of my garden disappeared during this period, and did not return until they were due to start nesting again. On the other hand in the Sime Road area, which was much richer in suitable grasses, the Spotted Munia was apparently present in little altered numbers all through the year.

Summary

A summary is given of the data obtained on the breeding season, nest and eggs of the Spotted Munia, *M. punctulata fretensis* Kloss, on Singapore Island. A comparison is made with the information available for the Siamese, Burmese and Indian races of this bird. It would appear that the breeding season (January to September) is longer on Singapore Island than it is further north, that the clutches are smaller there and that the eggs are slightly smaller in the Malay States as a whole than they are in Siam, Burma and India. Observations quoted show that sometimes in *M. p. fretensis* two hens function in the same nest. Information is not at present available on the lengths of the incubation and fledging periods.

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Appendix

The accompanying table summarises briefly the local nesting data available on all the Malayan members of the genus *Munia*. In the case of the other four species it is based on an appreciably smaller number of observations, and the breeding season, preferred nest site and clutch size may easily range more widely than is shown here.

Name and Malayan Checklist Number	Usual habitat in Malaya	Breeding Season on Existing Data	Preferred Site of Nest, and height above ground	Usual Size of full clutch	Average Size of Eggs
566 <i>M. alriceapilla sinensis</i> Blyth	Rice fields and open grassland	Jan.—May in Perak (Edgar, 1933); Dec.—May and in September (Chasen, 1936)	Lalang and low bushes; 1—4 feet	4—5	15.9 x 11.3 (7 eggs R.M.) 16.3 x 11.7 (17 eggs, Edgar, 1933)
567 <i>M. maja</i> (Linn.)	Open grassland and gardens; less frequently rice fields	Feb.—Aug. in Singapore (Spittie, 1950); All months, Perak (Edgar, 1933)	Bushes, hedges, low palms; 3—4 feet (Madoc, 1947); 2—15 feet (Edgar, 1933); 2—26 feet (Spittie, 1950)	4—6	16.2 x 11.7 (22 eggs R.M.) 16.3 x 11.9 (Edgar, 1933)
568 <i>M. punctulata fletcheri</i> Kloss	Lightly wooded grassland, <i>betula</i> and rice fields, near human settlements	Jan.—Sept. in Singapore; Feb.—May in Perak (Edgar, 1933)	Palms and trees; 15—40 feet	3—5	15.4 x 11.5 (23 eggs, see page 109) 15.5 x 10.9 (Edgar, 1933)
569 <i>M. striata</i> sub- <i>squamicollis</i> (Baker)	Kampong country; grassland with patches secondary jungle, clearings in light jungle	Jan.—February Perak (Edgar, 1933); Feb.—August (Madoc, 1947)	Trees; 7—12 ft. (Fruit trees, Edgar, 1933)	4—5	15.4 x 10.8 (19 eggs R.M.) 15.2 x 10.7 (Edgar, 1933) 16.5 x 11.4 (Madoc, 1947)

NESTING NOTES ON THE SPOTTED MUNIA

Name and Malayan Checklist Number	Usual habitat in Malaya	Breeding Season on Existing Data	Preferred Site of Nest, and height above ground	Usual Size of full Clutch	Average Size of Eggs
570a <i>M. leucogastra</i> <i>leucogastra</i> (Blyth)	Fringes of scrub and secondary jungle bordering open country, or forest clearings	March-May (Kellow, Baker 1934)	In low bushes in forest near villages (Kellow, Baker 1934); 3-6 feet	No data	15.5 x 11.5 (40 eggs; Baker 1934) ¹⁶
570b <i>M. leucogastra</i> <i>leucogastrisoides</i> Horsf. and Moore	Introduced Singapore Island. As for 569	May-October (few records)	Trees: 12-10 feet	about 4	Insufficient data

This table is based only on data at present available for the Colony of Singapore and the territory of the Federation of Malaya; records from Siam, etc. have not been considered in compiling it.

16. Baker's average may include some eggs from Tenasserim (1934: 23). Chasen (1939: 373) transcribes this as about 6 X .45 inches.

No. 13, A nest and eggs of the Black Babbling-Thrush, *Garrulax l. lugubris* (S. Muller).

There does not appear to be any published record of the nest and eggs of the Black Babbling-Thrush, *Garrulax l. lugubris* (S. Muller).¹⁷ On 29 October, 1949, F. G. H. Allen and Dr. B. D. Molesworth found a nest containing two fresh eggs on Fraser's Hill (alt. about 3,500 feet) on the Selangor-Pahang boundary. It was built in the fork of a slender sapling which was growing on a steep bank overlooking a jungle stream. The nest was about eight feet from the ground. Both nest and eggs were sent to the Raffles Museum.

The nest was a bulky, cup-shaped structure. It had an over-all diameter of about 175 mm. and a maximum depth of 110 mm. The cup was 90 mm. across and roughly 45 mm. in depth. The nest was composed entirely of vegetable fibres and leaves, and no mud had been used in its construction. The core and the lining were clearly defined and neatly formed. The outer layer which was partially decorated with bits of green moss was much more loosely put together, and it gave the nest as a whole a rather ragged, untidy appearance.

The core of the nest was formed of about 116 dried bamboo leaves, mostly 17-20 mm. wide and 130-170 mm. long; the largest piece was 38 × 285 mm. They were well moulded into the form of the cup, and in places interlaced and twisted over each other. With them were about 29 thin, wire-like strands of blackish fibre, probably from the Dudok Palm, *Caryota ucuatorialis* Ridley. The lining, which could be detached easily from the cup and taken out in one piece, consisted of about 112 of these strands, mostly 225-300 mm. long; the longest was about 395 mm. The outside of the nest was bound round with roots, strands of coarse vegetable fibre and epiphyte stems; in all there were about 63 pieces in this layer, mostly ranging from 300-450 mm. in length, with the longest strand 1,170 mm.

Unfortunately the eggs were broken in getting them down from the nest. One would appear to have been approximately 23 × 31 mm. It is pyriform in shape. The shell is very slightly glossy. The colouring is reminiscent of the egg of the European Song-Thrush. The ground colour is a pale Nile Blue (Ridgway, 41. BB-G. f.); over it are a few small, irregular spots and smudges, and a few fine pin-point dots, all of charcoal black.

¹⁷. Malayan Checklist No. 398. Mr. C. X. Furtado, of the Botanic Gardens Singapore, kindly identified the strands of blackish fibre.

NOTES ON THE SINGAPORE CHECKLIST

No. 14 Annotations, Addenda & Corrigenda to the Singapore Checklist.

The Checklist of the Birds of Singapore Island (this journal, 21, January 1950: 132-183) was completed at the beginning of June, 1949. The following information has come to hand since that date.

16. *Ardeola bacchus* (Bonaparte). A scarce winter visitor to Singapore Island; recent visual records, Molesworth 1940 and F. G. H. Allen 1948. Searight reports a bird seen almost daily from 19 December, 1948, to 13 March, 1949, along the line of a drain in the Alexandra Road area; one seen in the bog behind Alexandra Road, 11, 12 and 18 March, 1950; four, of which three were in breeding plumage, seen on 19 April, 1950. Winter plumage birds are ascribed to *bacchus* as we have no positive identifications of *grayii* from the Malayan area (cf. the note in the Malayan checklist). The number of recent records, as in the case of *Elanus c. caeruleus* below, suggests that this bird is probably a fairly regular winter visitor in very small numbers.
17. *Ardeola ibis coromanda* (Boddaert). Several records have now come to hand of birds seen during the first two weeks of April; the latest is 19 April (Searight). October-March, as given in the checklist, should probably be extended to early April.
42. *Elanus c. caeruleus* (Desfont.). In 1950 solitary examples of the Blackwinged Kite were recorded by four observers, including the present writer, mostly over open country, from January to early March. One was seen over the Sepoy Lines Golf Course (17 January), one over waste ground near the Kallang airfield (early February) and one near Sime Road (early March). Dr. G. H. Lowe reported a bird visiting his fowl-run on several different occasions early in March, and attempting to take nearly fledged chickens. All these records may refer to the same individual, but they suggest, though they do not prove, that the Blackwinged Kite is more than a "Scarce winter visitor" to the island.
61. *Ichthyophaga i. ichthyæetus* (Horsf.). The Greyheaded Fishing-Eagle was added to the Singapore list in a foot-note on the strength of a bird seen off Loyang by F. G. H. Allen on 15 November, 1949. On 12 January, W. T. Loke and the present writer investigated a nest built in a fork near the top of a tall tree on a thickly wooded slope overlooking one of the Singapore reservoirs. One of the birds rose from a perch about 200 yards from the nest as we approached along the waterway, and flew past us at a height of 50-60 feet. The other was sitting, but slipped away very readily when the trunk of the tree was hit with a parang. It flew about 100 yards to another tall tree,

where it remained for 25-30 minutes; then it cautiously made its way back to the nest, waiting for varying intervals on two intermediate trees and taking in all nearly an hour before it finally settled down again. Later the other bird returned to the neighbourhood of the nest, flying very low over the tree tops and not across the water. The birds were undoubtedly Greyheaded Fishing-Eagles. It is interesting to note that their flight was markedly lighter and easier than that of *Halixetus leucogaster*, a point which Allen had stressed in recording the bird seen off Loyang.

This is the first report of a nest located in the Malay Peninsula. It was placed in much the same situation as those recorded by Stuart Baker (1928: 115) in India. It was a large, untidy platform of sticks and small branches, about 3 feet high and $4\frac{1}{2}$ -5 feet across at the top. The fork in which it was situated was roughly 90 feet from the ground, and 20-25 feet from the top of the tree. The tree itself was some 50-60 feet from the water's edge, and appreciably taller than the majority of those round it. The birds thus had a clear view over the reservoir, and could approach easily from the landward side by alighting first on one of two big trees rising above the wooded cover of the bank behind them. Fishing-Eagles are said to have used the site for a number of years. On this occasion it was thought that they had been sitting for about three weeks. This suggests that the eggs were laid during the third week in December. Unfortunately the nest was attacked by a party of Longtailed Macaques, *Macaca irus*, about ten days after our visit, and the birds deserted it. They attempted to build again on another tree some 200 yards away, working on the remains of another old nest, but after adding a number of fresh branches, some with green leaves still on them, they abandoned it. According to Stuart Baker the Greyheaded Fishing-Eagle breeds from November to February in India, whilst Bingham took eggs on 3 March on the Thoungyeen River in Lower Burma. Lewis (1946: 5) gives an excellent photograph of a nesting bird with one almost fully fledged chick taken in Bengal on 7 May, 1944.

74. *Falco peregrinus calidus* Latham. A scarce winter visitor to Singapore Island. Searight reports a solitary bird seen over the Tanglin barracks on 11 March, and again on 12 and 18 April, 1949; also 19 February, 1950.

133. *Capella megala* (Swinhoe). Searight took a single bird on 14 January, 1950; his bag of *C. stemura* (Bp.) for the season was 193. In April Molesworth had two *megala* out of a total of about 150 *Capella* shot on Singapore Island and in south Johore in 1940 and the first half of 1941. Figures for the central Malay States give about one Swinhoe's Snipe to every

250-300 Pintails. Seemingly *megala* is slightly more numerous on Singapore Island. It is still more plentiful in Sarawak, and again much commoner in North Borneo. There are apparently no records for Siam and Indo-China. Presumably the birds are reaching the Malay Peninsula by the southern route round the South China Sea, coming along the west coast of Borneo and across by way of the Tambelan Islands.

147. *Glareola maldivarum* (Forst.). The Eastern Pratincole is almost entirely a passage migrant on Singapore Island, and there are very few winter records. In a normal year it is most numerous from September to November, on its southward journey. In the 1949-50 season there were very few autumn records, but it was apparently conspicuous and plentiful, particularly over the golf-courses, in the spring. A number of reports were received, extending from 27 February to the last day of March. This suggests a rather late run. According to Bromley (1949: 122) in the years 1938-40 the birds first appeared in Kedah, where they may possibly be breeding, regularly between 3-5 March, while Herbert (1926: 344) reports nesting in central Siam with fresh eggs from mid-March to mid-June. Madoc (MS notes) says that at Bangkok he saw the first birds of the 1949 season on 6 March, and a week later found a party which he thought were establishing a breeding colony on a patch of newly-burnt padi-field; subsequently, however, they moved away. The local peasants assured him that the birds did not normally start laying until after the first heavy rains of the wet season. The only nest which he found was at Ban Khlong Tan, near Bangkok, on 8 May.¹⁸ This is much later than the dates given by Herbert, but on the other hand Madoc does confirm the early arrival of these birds in central Siam, if not the supposed early date of laying.

189. *Penthoceryx sonneratii*, probably *malayanus* Chasen & Kloss. Both this race and a single example of the Sumatran race, *P. s. fasciolatus*, have been taken on Pulau Ubin, in the eastern part of the Johore Strait, but there was no record for Singapore Island. Early in March F. G. H. Allen, who had previously collected a specimen of *P. s. malayanus* on Pulau Ubin, saw a Banded Bay Cuckoo in Stevens Road, Tanglin. The bird was in the neighbourhood for about a week, and was subsequently seen by H. Lewin and M. W. F. Tweedie.

¹⁸. See also the paper by Madoc in this journal. It is of interest to note that in addition to the observations by Bromley suggesting that *maldivarum* may possibly be breeding in Kedah we have a recent summer record from Kelantan. Edgar (*in litt.*) reports a bird seen at Semerak, on the Kelantan coast, on 1 June, 1950.

G. F. Mees has recently drawn my attention to a point of interest in relation to this record. Chasen (1927: 148) reports a nestling of the Brain-fever Bird, *Cacomantis merulinus threnodes* Cabanis & Heine, taken from a nest of a Common Iora, *Egithina tiphia singapurensis* Chasen & Kloss, on Singapore Island: he gives no further details. Mees (*in litt.*, 26.9.50) tells me that in Java *E. tiphia* is not known to be a foster-parent of *C. merulinus* so far as he is aware, but that it is the only recorded fosterer of *P. sonneratii*. He adds "I myself observed a fledgling of this species being fed by two Common Ioras in the Botanic Gardens of Buitenzorg in May 1947. As the young of *merulinus* are somewhat barred too, and identification of a nestling must be very difficult, it seems very well possible to me that the nestling was a *P. sonneratii*." The young bird to which Chasen referred is still in the Raffles Museum collection: part fledged, exposed culmen 11 mm., wing flat 60 mm., tail very short. I have examined it carefully. Unfortunately I am not sure on what character(s) the distinction could be made between nestlings of *merulinus* and *sonneratii*, but I can detect no feature which is incompatible with the latter diagnosis; on the whole the specimen seems to be closer to the immature examples of *sonneratii* here than to our immature *merulinus*. It seems likely, therefore, that although the point was not appreciated earlier we have long had an indication of the occurrence of *P. sonneratii* on Singapore Island.

239. *Apus pacificus* (Latham) subsp. An adult taken by F. G. H. Allen from a small flock over Changi Airfield on 12 November, 1950 is an example of the typical race, not *cooki* (Harrington). Both forms are recorded from the mainland of the peninsula (Malayan Checklist, p. 112). This is the first example from Singapore Island that I have examined: possibly both races occur here, but for the present the Singapore list should be amended to read *Apus p. pacificus* (Latham).

361. *Corvus splendens protegatus* Madar. The Ceylon House-Crow was introduced into the neighbourhood of Klang, in Selangor, about 1895. It has established itself satisfactorily in the district (see Madoc, 1947: 95), but does not seem to have spread far afield. According to an MS note left by Chasen an attempt was made to introduce it in Singapore some time ago, but it was not successful. There was certainly no indication of its presence on the island before the war. Recently Lewin has drawn our attention to a small colony of these birds breeding in a tree between godowns 26 and 27 at Tanjong Pagar. The

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birds are said to have been there since 1948 at least; this suggests strongly that they established themselves during the Japanese occupation or the B.M.A. period.

428. *Pycnonotus aurigaster aurigaster* (Vieillot). This bird is seemingly still present and breeding on the outskirts of Singapore. Searight reports three adults seen near Kay Siang Road on 5 February, 1949, and three fully fledged young in the same place on 7 July. Two adults were seen there again on 12 January, 1950; they appeared to be breeding in the neighbourhood, but no nest was found; three fully fledged young were seen on 19 April. The closely allied *P. goiavier personatus* (Hume) normally lays 2 eggs to a clutch in the southern part of the peninsular, and I have only one record of a clutch of 3 (V. W. Ryces, no precise data); on the other hand in Patani, judging by a series taken by Aagaard's collector at Bang Nara, 3 is not unusual. According to Hoogerwerf (1949: 159) *aurigaster* lays 2-3 eggs to a clutch in Java; he says that eggs have been recorded from December to October, with the peak laying period in May and June (based on a total of 236 nests examined).

472bis. *Acrocephalus bistrigiceps* Swinhoe. On 4 December, 1949, L. K. A. Charles, the Raffles Museum collector, took an adult male of this bird on the edge of the wooded section of the Nee Soon catchment area. The Blackbrowed Reed-Warbler must, therefore, be added to the Malayan and Singapore checklists as No. 472bis.

The only previous records for the Malaysian sub-region are for Peninsular Siam. Robinson (1915: 150) lists two females taken on Koh Pennan among high grass on 29 and 30 May, 1913; Koh Pennan (approx. lat. 9° 45' N.) lies off the Bandon Bight, eight miles from Koh Samui, on the east side of the peninsula. Robinson and Kloss (1924: 320) give a further two females taken at Mamoh, on the Pakelan Estuary (approx. lat. 10° 13' N.) on 27 February, 1919. There do not appear to be any other records for this area. Chasen (1939: 322) describes the Blackbrowed Reed-Warbler as a winter visitor to the north of the Peninsula, and says that local specimens are all from Peninsular Siam. Deignan (1945: 485) says that it is a locally common winter visitor to Northern Siam. His dates for this region run from 13 October (Thattafang, 1936) to 8 April (Ban Huai Pa Khan, 1937). The Raffles Museum collection still has the bird from Koh Pennan taken on 30 May, 1913, (Marked "♂" on the field label!), and one of the two skins from Mamoh.

505. *Muscicapa mugimaki* Temminck. Lewin gives a visual record of a male of this species seen in a garden on the outskirts

of Singapore on 9 April, 1950. It occurs in some numbers as a winter visitor in the northern half of the Federation of Malaya, the birds appearing first on the off-lying islands in the Malacca Strait, and then moving up to the higher mountains, where they remain until about the end of March. The most southerly formal records for Malaya in the Raffles Museum collection are an example taken on Pulau Pisang, off the south-west corner of Johore (*nat. coll.*), and one from Cape Rachado, near the boundary between Negri Sembilan and Malacca territory (*nat. coll.*). It does not appear to have been recorded from the islands south of Singapore.

Dr. van Bemmelen has kindly supplied me with details of all the specimens from Indonesia in the Bogor (Buitenzorg) collection. More than half were taken in Aehin (Atjeh), at the north end of Sumatra, between 29 January and 15 April. Seven of the skins were collected in the Lampongs district, southern Sumatra, in December, and a further six at points in western Java (Tjianten Salak, Tjibodas and Tjikudjang) between 17 December and 2 March. The Raffles Museum collection contains four examples from this area taken in the same period by Robinson (3, Tjibodas, alt. 4,000–6,000 feet) and Kloss (1, Oedjoengteboe, alt. 2,000–3,000). According to Dr. Voous (1950) the only Malaysian specimen of *mugimaki* with full data in the Amsterdam Museum was taken in the Van Heutz Range, north-east Sumatra, alt. 2,500 feet, on 28 February.¹⁹ The localised specimens at Leiden came from the Padang Highlands and Fort de Kock in Sumatra, and the Malabar Mountains in western Java (Junge, 1950). There are also additional published records for Sumatra—the neighbourhood of the Toba Lake in the north-east, Padang Highlands in the centre, and the Korinchi valley. In the latter area Robinson and Kloss (1918: 159) found it sparingly in secondary jungle and the edges of clearings at altitudes from 2,600–4,000 feet, in March.

All the dated examples from Sumatra and western Java (the only portion of Java from which *mugimaki* has been recorded) were taken between the beginning of December and the middle of April, the period during which this bird is normally

¹⁹ Dr. Voous (*in litt.*, 12.7.50) tells me that he does not know of any lowland locality in which *Muscicapa mugimaki* has been taken in Java. Hoogerwerf (*Te avifauna van Tjibodas en omgeving (Java)*; pub. Koninklijke Plantentuin van Indonesië, Bogor, 1949: 120–121) says that it may be seen occasionally, but not at all frequently, during the period of the west monsoon along the forest edges near Tjibodas and higher still in the mountains; in this area it can also be observed in isolated trees and small groups of trees in open country, but it is not usually found far from old forest. I am indebted to Dr. Voous for drawing my attention to this passage. The habitat defined is very similar to that in which *mugimaki* occurs in high hill country in Malaya.

found in mountain country, not on the Malacca Strait islands or in the coastal districts, in Malaya. Further all the Indonesian specimens were collected in hill or mountain country: even the examples from Lampongs were taken in the foothills along the western border of the province. The evidence available suggests that the birds normally come down the line of the eastern side of the Malacca Strait in October and November, and thence move inland to higher ground from the point reached in November or December. Those dispersing to the east do not presumably normally travel further south than the end of the central mountain mass, and thus they neither pass over nor reach Singapore and the lowlands of the southern portion of the Malay Peninsula. On the other hand those moving to the west continue further south along the line of high hill country in western Sumatra, and thence to western Java.

M. mugimaki is probably fairly plentiful in the highlands of North Borneo during the winter months; it has certainly been recorded on several occasions from Mount Kinabalu and its environs. The British Museum has a good series said to have been obtained by Hugh Low at Labuan (B.M. cat., 4, 1879: 202), but these may have come from somewhere in the interior. I cannot trace a record for Sarawak; Moulton (1914: 142) knows of it only from North Borneo, and Tom Harrisson (*in litt.*) tells me that he has no local skins in the Kuching Museum. There is obviously less information available here, but it suggests again that possibly the birds come south for only a limited distance at a low altitude, and then turn up into hill country.

Robinson (1928: 140) includes the Moluccas in its winter range, but according to van Bemmelen (1948: 346) there is only one record for the area, a bird said to have been taken on Ternate by Beccari (Salvadori, 1881: 81).

517. *Pachycephala cinerea butaloides* Stresemann. On 25 March Lewin, Searight and F. G. H. Allen found a nest of this species in the mangrove zone near the end of the west coast road, beyond Pasir Panjang. It was situated in a horizontal fork near the top of an Api-Api tree, *Avicennia intermedia* Griff., about 18 feet from the ground, and 6-7 feet out from the main trunk. An adult bird was seen to go on the nest. On 3 April, Lewin cut the branch down. The nest contained two fresh eggs, one of which was broken in lowering it to the ground. It is a light, cup-shaped structure, about 8.5 cm. across and 4.5 cm. deep, with the cup 6 x 3 cm. It is formed of fibres and fine rootlets neatly put together, and sparsely lined with about 35 leaf stems of a small climbing fern. It is slung, like the nests of *Zosterops*, between two twigs which are built into its rim and further held there by a few strands of spiders' web silk.

Additional support is given by a twig from another branch which passes adventitiously through its rim. The two eggs are bluntly oviform in shape, with the surface smooth and slightly glossy. The ground colour is pale ochraceous-buff (Ridgway, 15.Y-O.f.); over it are a few rather coarse spots of deep gull grey (below) and cinnamon brown, the majority of which congregate to form a diffuse ring round the broader end. The unbroken egg measures 22.0×16.6 mm.

This is the first record of a nest taken on Singapore Island. Edgar (in Chasen, 1939: 231) reports three nests from the Sitiawan district of Perak, all built in rubber trees at heights of 30-50 feet from the ground. Two, found in June, contained young birds; the third, found on 27 March, had two eggs in it. Edgar gives the colour of the eggs as creamy white, spotted with brown and dark brown, and with underlying spots of pale purplish; dimensions $.8 \times .61$ and $.82 \times .62$ inches. Osmaston (1906: 159) found nests in the Andamans in May and June. They were all in small trees and from 6-12 feet from the ground. He describes the eggs as dark cream or *café-au-lait*, spotted with dark yellowish brown or sepia, the spots being rather small, not numerous and tending to form a zone towards the broad end of the egg; he says they vary very little in size, with the mean of 8 eggs $.85 \times .62$ inches. Hoogerwerf (1949: 227) gives the normal clutch as two. He quotes 14 nests with eggs from western and middle Java found in February (1), March (1), April (2), May (6), June (2), July (1) and August (1). It would seem that breeding may occur over a wide period in Java, but that April to June is the peak period there. Hoogerwerf gives the average dimensions (based on 13 eggs) as 21.67×15.82 mm.; range, length 19.6-23 mm., breadth 15-16.60 mm. Osmaston's average for 8 eggs works out at approximately 21.6×15.7 mm., and all the other measurements quoted lie within the range published by Hoogerwerf.

565. *Padda o. oryzivora* (Linn.). This bird should have had an asterisk after "Introduced". Kelham (1881: 524) records two pairs breeding under the eaves of the Tanglin barracks in July, 1879. He comments on their tameness, and their apparent concentration in the Tanglin area. At that time they were kept, with other species, in aviaries in the Botanic Gardens, and Kelham seems to have thought that the birds had escaped from there. This is possible, but judging by the various comments made by Hume on the material collected by Davison in Singapore a few years earlier, it would seem to have been plentiful and at least fairly widespread on the island at this date; "in the Malay Peninsula we do not know of its occurrence anywhere outside the island of Singapore. There it swarms . . ."

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(Hume and Davison, 1878: 404). It is of interest to note that Chasen (1924: 69) also describes it as "one of the commonest birds in Singapore . . . (and) found in most parts of the island". It is certainly not rare at the present time, but it is not by any means one of the commonest birds, nor was it over plentiful, or very widespread, in the years immediately before the recent war. Possibly conditions have grown less favourable for it in the last quarter of a century, apart from the difficulties that it must have encountered during the Occupations. Before the war it seems to have been existing largely on fallen grain and the cooked rice put down for domestic chickens. Obviously there has been a relative scarcity of these things during the last ten years, but fallen grain may have been getting steadily less plentiful as the horse disappeared from the Singapore streets. The Java Sparrow still appears to be less numerous than it was in 1940.

Revisions

350a. *Dissemurus paradiseus platurus* (Vieill.). Vaurie, in a recent revision of the family Dicteruridae, shows that "All the characters formerly used for generic segregation may vary geographically, even within a species. As a result, the only consistent solution, especially in view of the existence of connecting forms, is to unite all the species in the genus *Dicterurus*, with the exception of *papuensis* for which a separate genus (*Chaetorhynchus*) is admitted". This makes No. 350 on the Malayan list *Dicterurus paradiseus*, and the bird found on Singapore Island becomes *Dicterurus paradiseus platurus* Vieill.

427. *Pycnonotus jocosus erythrotis* (Bp.). The Redwhiskered Bulbuls resident in Kedah, Perlis and Kelantan cannot be separated from birds occurring further north in Peninsular Siam. In the Malayan checklist the name *Pycnonotus jocosus pattani* Deignan (type locality Pattani, lat. 6° 50' N., long. 101° 15' E.) is accordingly used for them. It had always been assumed here that the birds found in Singapore came originally from eastern India. When revising the Singapore list I therefore retained Chasen's *P. j. erythrotis* (Bp.). Actually this name is not acceptable on two counts. As Deignan (1948: 280) shows, *I(xos) erythrotis* Bonaparte 1850 is preceded by *Haematornis erythrotis* "Swains." in J. E. Gray 1846, which is itself a *nomen nudum*. The name for the birds occurring in the lowlands of eastern India should be *P. j. emeria* (Linn.). I give it here in case it should at any time be needed, but it would seem that the stock of Redwhiskered Bulbuls at present feral in Singapore did not come from India. The races *emeria* (Linn.) and *peguensis* (Stuart Baker), used by Chasen (1923:

104),²⁰ have the infraocular tufts long and brighter, as in the other Indian races. All the Singapore birds that I have seen have the tufts short and darker, as in *pattani* and the eastern races. Five of the Raffles Museum skins from Singapore are indistinguishable from a series of 25 adults of *pattani* taken in the northern part of the peninsula and in Siam proper; one (coll. Molesworth, 11 May, 1941) is slightly darker and more drab above. For the present it seems advisable that the Singapore birds should be known as *P. j. pattani* Deignan; though it must be understood that this choice of name does not in any way effect the general proposition that their presence here is due to the escape of caged birds, and not to a natural spread from the north. It is not possible to comment on the subspecific status of the birds found in the neighbourhood of Kuala Lumpur as the only skin that we have here is of a juvenile, which accordingly lacks the infraocular tufts.

Deignan (1948: 281) gives the range of *pattani* as Indochina south of central Annam and Haut-Laos, all Siam, and Malaya south to Penang Island and Kelantan. At the end of his note he remarks that specimens "from the Malay Peninsula seem to have the broken pectoral band more nearly joined across the breast, but this could easily result from their having the body less tightly stuffed with cotton". The specimens in the Raffles Museum series suggest that this is a most variable character in peninsular birds, but that it is by no means entirely due to the caprice of the collector. In 4 of our skins the dark band is clearly continued across the pectoral region, though it is very narrow in the midline; in a further 2 it is only just broken, while in the remainder the apparent gap ranges inconsistently from approximately 5-15 mm. in width. The relevant examples are as follows. An adult male taken by Aagaard's collector at Bangnara on 18 May, 1924 has the band unbroken, while a second male taken on the same day shows a gap of about 12 mm. F.M.S. Museum collectors working at Chong, in Trang, in December 1909 and January 1910 took 2 males and 1 female with the gap just closed, and 2 males and 1 female in which it ranged from 6-15 mm. in breadth. A Dayak collector from the Raffles Museum operating at Ronpibun, Nakon Sri Tamarat, in February and March 1922, took 1 male and 1 female with the gap almost closed and 4 females with it seemingly patent for about 10-15 mm.

²⁰. This paper, an introduction to the birds of Singapore Island, was actually published in 1923, but I and several others have on occasions cited it as 1922. The original journal is scarce, and the author's reprints are erroneously labelled 1922.

NOTES ON THE SINGAPORE CHECKLIST

Corrigenda

The names of the following birds on the Singapore Checklist should be corrected to read as shown below,

- No. 95 *Rallina eurizonoides nigrolineata* (G. R. Gray).
169 *Ducula acnea polia* (Oberh.).
442 *Microscelis charlottae cryptus* (Oberh.).

The correct number for the Malayan Tree-Sparrow, *Passer montanus maluccensis* Dubois, is 563, not 564 as shown on page 176 of the list.

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